Chapter 296-831 WAC

CRANES, DERRICKS, AND OTHER LIFTING EQUIPMENT

NEW SECTION

WAC 296-831-100 Scope. Chapter 296-831 WAC, Cranes, derricks and other lifting equipment, applies to the construction, installation, operation, testing, inspection and maintenance of:

- Power- and hand-operated cranes.
- Crane monorail systems.
- Crane runways.
- Derricks.

Exemption: This chapter does **not** apply to:

- Automobile- or railway-wrecking cranes.
- Shipboard cranes.
- Well drilling derricks.
- Skip hoists.
- Mine hoists.
- Truck body hoists.
- Car or barge pullers.
- Excavating equipment.

Many companies use various types of equipment to move large, heavy loads. Many issues regarding safe equipment operation and employee safety must be addressed.

This chapter contains information that employers need to help keep their employees safe while working with this equipment.

NEW SECTION

WAC 296-831-200 Bridgestyle cranes.

Introduction:

WAC 296-831-200 through 296-831-240 apply to the following types of cranes, whether power-driven or hand-operated, as well as to related equipment:

- Cranes with top running or underhung bridges using top or underhung trolleys.
- Gantry, semigantry, and cantilever gantry cranes.

- Wall or pedestal mounted jib cranes.
- Polar cranes.
- Monorail systems.

NEW SECTION

WAC 296-831-210 Design and installation requirements for bridgestyle cranes.

Summary:

Your responsibility:

To make sure bridgestyle cranes are safe for operation.

Make sure equipment meets the appropriate design and construction requirements of his rule

WAC 296-831-21005.

Use rail clamps and wind indicators

WAC 296-831-21010.

Have rated load markings on your cranes

WAC 296-831-21015.

Maintain proper clearances

WAC 296-831-21020.

Provide safe access to the cranes

WAC 296-831-21025.

Provide stops for all bridgestyle cranes

WAC 296-831-21030.

Provide stops, bumpers and rail sweeps for top-running bridge cranes

WAC 296-831-21035.

Provide adequate guards on cranes

WAC 296-831-21040.

Make sure electrical equipment is safe

WAC 296-831-21045.

Use proper controllers

WAC 296-831-21050.

Provide safe switches

WAC 296-831-21055.

Have a warning device on the crane

WAC 296-831-21060.

Provide fire extinguishers for bridgestyle cranes

WAC 296-831-21065.

Store personal and work materials properly on bridgestyle cranes

WAC 296-831-21070.

NEW SECTION

WAC 296-831-21005 Make sure equipment meets the appropriate design and construction requirements of this rule.

You must:

Make sure all cranes in use prior to March 1, 2004, meet the design, construction and stability requirements as defined by the appropriate American National Standard Institute regulation, either:

✎ USAS B30.2 - 1967, Overhead and Gantry Cranes;

OR

✎ ANSI B30.11 - 1973, Monorail Systems and Underhung Cranes;

OR

✎ ANSI B30.17 - 1973, Single Girder Top Running Cranes.

Make sure all new cranes acquired for use on or after May 1, 2004, meet the design, construction, and stability requirements as defined in this section and either:

✎ ASME B30.2 - 1996, Overhead and Gantry Cranes, including addenda A 1997, addenda B, 1998, and addenda C, 2001;

OR

✎ ASME B30.11 - 1998, Monorail Systems and Underhung Cranes, including addenda A, 1999;

OR

✎ ASME B30.17 - 1998, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist), including addenda A, 1999 and addenda B, 2001.

NEW SECTION

WAC 296-831-21010 Use rail clamps and wind indicators.

You must:

✎ Make sure outdoor cranes with a top-running bridge have both:

- Automatic or remotely operated rail clamps, parking brakes or other equivalent devices capable of holding the crane against a wind pressure of thirty pounds per square foot;

AND

- A wind-indicating device that gives a visible or audible alarm to the crane operator at a specified wind velocity.

NEW SECTION

WAC 296-831-21015 Have rated load markings on your cranes.

You must:

✎ Make sure a crane's rated load is marked ALL these ways:

- Plainly marked and legible from the ground or floor on each side of the crane or component attached to the bridge girder.

- Marked and legible from the ground or floor on each hoisting unit or load block if more than one hoisting unit is used so that it can be read from the ground or floor.

NEW SECTION

WAC 296-831-21020 Maintain proper clearances.

You must:

✎ Maintain clearances between:

- The crane and any obstructions.
- All cranes operating on parallel runways.

NEW SECTION

WAC 296-831-21025 Provide safe access to cranes.

You must:

✎ Provide safe access to the cab or service platform by one of these means:

- A ladder.
- Stairs.
- A platform.

Reference: See requirements for ladders and stairways in chapter 296-24 WAC Part J-1, and WAC 296-800-250.

You must:

✎ Make sure service platforms meet ALL of the following:

- Have an anti-slip walking surface, such as unfinished wood or a surface painted with nonskid paint.
- Have at least eighteen inches of clear passage space.

✂ Opposite the bridge motor, clear passage space can be decreased to fifteen inches.

- Are of substantial construction.

– Provide a safety factor of four times the imposed maximum load.

– Are kept clear of obstructions.

– Have toeboards and handrails.

Reference: See additional requirements for toeboards and handrails in WAC 296-800-26010.

NEW SECTION

WAC 296-831-21030 Provide stops for all bridgestyle cranes.

You must:

✎ Provide stops for trolleys and carriers. Stops must be:

– At the limits of travel of the trolleys and carriers.

– Able to resist the force that is applied when contacted by the crane.

NEW SECTION

WAC 296-831-21035 Provide bumpers and rail sweeps for top-running bridge cranes.

You must:

(1) Provide bridge bumpers or other automatic means to provide the same effect for top-running bridge cranes. They must be able to do all of the following:

✎ Stop the bridge when it is traveling at forty percent of the rated load speed.

✎ Stop the bridge (when not carrying a load and after power is cut) without decelerating faster than an average of three feet per second squared from twenty percent of the rated load speed.

✎ Retain the bumper in case of broken or loose mounting connections.

(2) Provide trolley bumpers or other automatic means to provide the same effect. They must be on adjacent ends of all trolleys operating on the same bridge and be able to do all of the following:

✎ Stop the trolley when it is traveling at fifty percent of the rated load speed.

✎ Stop the trolley (when not carrying a load and after power is cut) without decelerating faster than an average of 4.7 feet per second squared from one third of the rated load speed.

✎ Retain the bumper in case of broken or loose mounting connections.

(3) Provide bridge rail sweeps that extend below the top surface of the rail in front of the leading wheels on both end trucks.

NEW SECTION

WAC 296-831-21040 Provide adequate guards on cranes.

You must:

✎ Make sure that guards are used to prevent contact between bridge conductors and hoisting ropes, if they could otherwise come into contact during normal operations.

✎ Make sure open runway conductors are located or guarded so they prevent accidental contact with hoisting ropes.

Reference: See additional guarding requirements in WAC 296-802-200.

NEW SECTION

WAC 296-831-21045 Make sure electrical equipment is safe.

You must:

✎ Make sure any pendant controls meet ALL of the following:

- They do not exceed voltage of 150 volts for AC and 300 volts for DC.
- They are supported to protect the electrical conductors against strain.
- They are constructed to prevent electrical shock.
- They are clearly marked to identify their functions.

Reference: See wiring and electrical equipment requirements in chapter 296-24 WAC, Part L, and WAC 296-800-280.

NEW SECTION

WAC 296-831-21050 Use proper controllers.

You must:

(1) Make sure top-running bridge cranes have a device that disconnects all motors from the line if a power failure occurs. For example, a spring-return controller, a spring-return master

switch, or momentary contact push buttons.

(2) Make sure any lever-operated controller in a cab- or pulpit-operated crane has a notch or latch that prevents the handle from being accidentally moved to the "ON" position.

(3) Make sure rope-operated controllers automatically return to the "OFF" position when released by the operator.

(4) Make sure push buttons in pendant stations automatically return to the "OFF" position when pressure is released.

NEW SECTION

WAC 296-831-21055 Provide safe switches.

You must:

(1) Make sure the power supply to runway conductors is controlled by a switch or circuit breaker that is ALL of the following:

- On a fixed structure.
- Accessible from the floor.
- Able to be locked in the off position.

(2) Make sure cab-operated cranes and carriers have a switch or circuit breaker that is ALL of the following:

- Enclosed.
- Able to be locked in the open position.
- Provided in the leads from the runway conductors.
- Located within easy reach of the operator.

(3) Make sure floor, remote, or pulpit-operated cranes have a switch or circuit breaker that is ALL of the following:

- Enclosed.
- Able to be locked in the open position.
- Provided in the leads from the runway conductors.
- Located within easy reach of the operator.

(4) Make sure electric traveling cranes have an overtravel limit switch to stop hoist motion.

(5) Make sure all cranes using a lifting magnet have an enclosed circuit switch that discharges the inductive load and is able to be locked in the "open" (OFF) position.

NEW SECTION

WAC 296-831-21060 Have a warning device on the crane.

You must:

✎ Make sure cab- and remote-operated cranes are equipped with an effective audible or visual warning signal. Examples of such devices include the following:

- Manually operated gong.
- Power-operated bell, siren or horn.
- Rotating beacon.
- Strobe light.

NEW SECTION

WAC 296-831-21065 Provide fire extinguishers for bridgestyle cranes.

You must:

✎ Make sure a fire extinguisher with a minimum extinguisher rating of 10 BC is kept in crane cabs.

Reference: See additional requirements relating to portable fire extinguishers in WAC 296-800-300, Portable fire extinguishers.

NEW SECTION

WAC 296-831-21070 Store personal and work materials properly on bridgestyle cranes.

You must:

Make sure clothing, personal belongings, tools, and other necessary articles are stored so they do not interfere with crane access or operation.

NEW SECTION

WAC 296-831-220 Hoisting equipment on bridgestyle cranes.

Summary:

Your responsibility:

To make sure hoisting equipment on bridgestyle cranes is used correctly.

You must:

Use and maintain sheaves on bridgestyle cranes properly WAC 296-831-22005.

Follow these requirements when using hoisting ropes on bridgestyle cranes WAC 296-831-22010.

Use reeving accessories on bridgestyle cranes correctly WAC 296-831-22015.

Use hooks on bridgestyle cranes correctly WAC 296-831-22020.

NEW SECTION

WAC 296-831-22005 Use and maintain sheaves on bridgestyle cranes properly.

You must:

✎ Make sure sheaves are:

- Smooth and free from surface defects that could cause wire rope damage.
- Guarded in a way that prevents the rope from jamming.

NEW SECTION

WAC 296-831-22010 Follow these requirements when using hoisting ropes on bridgestyle cranes.

You must:

✎ Make sure wire rope is used as follows:

- Use only wire ropes recommended by the crane manufacturer.
- Make sure the rated load divided by the number of parts of rope does not exceed twenty percent of the minimum breaking strength of the rope.
- Use rope appropriate for the conditions, such as environmental conditions and extreme heat.
- Follow the manufacturer's recommendations when socketing.
- Make sure tension in all parts of the rope is equal, if more than one part is used to support the load.

✎ Attach the wire rope to the crane as follows:

– The rope end must be anchored securely by a clamp attached to the drum or a socket arrangement specified by the crane or rope manufacturer.

– There must be enough rope so that at least two wraps of rope are on the drum when the hook is in its lowest position.

NEW SECTION

WAC 296-831-22015 Use reeving accessories on bridgestyle cranes correctly.

You must:

✎ Use reeving accessories correctly, as follows:

– Attach U-bolts on the dead or short end of the wire rope, with the live end resting in the saddle (see Illustration 200-1).

– Use only drop-forged steel wire rope clips, not malleable cast iron.

– Follow the clip manufacturer's recommendation for spacing, number of clips, and tightening evenly to the recommended torque values.

– Retighten all nuts on clip bolts after initial load is applied to newly installed wire rope.

– Make sure swaged or compressed fittings are applied as recommended by the wire rope, crane, or fitting manufacturer.

Place illustration here.

NEW SECTION

WAC 296-831-22020 Use hooks on bridgestyle cranes correctly.

You must:

✎ Make sure hooks:

– Are either latched, with the latch bridging the throat opening of the hook, or are moused.

– Meet the manufacturer's recommendations.

– Are not overloaded.

NEW SECTION

WAC 296-831-230 Inspections, maintenance, and testing of bridgestyle cranes.

Summary:

Your responsibility:

To keep bridgestyle cranes in safe operating condition by performing regular inspections, maintenance, and testing.

You must:

Service level definitions for bridgestyle cranes WAC 296-831-23001.

Perform initial inspections on bridgestyle cranes WAC 296-831-23005.

Perform frequent inspections on bridgestyle cranes WAC 296-831-23010.

Perform periodic inspections on bridgestyle cranes WAC 296-831-23015.

Inspect wire rope on bridgestyle cranes regularly WAC 296-831-23020.

Replace wire rope on bridgestyle cranes as required WAC 296-831-23025.

Maintain and store wire rope for bridgestyle cranes safely WAC 296-831-23030.

Replace chain as required WAC 296-831-23035.

Establish and follow safe maintenance and repair procedures for bridgestyle cranes WAC 296-831-23040.

Lubricate parts safely WAC 296-831-23045.

Repair or replace hooks on bridgestyle cranes as required WAC 296-831-23050.
Perform operational tests on bridgestyle cranes WAC 296-831-23055.

NEW SECTION

WAC 296-831-23001 Service level definitions for bridgestyle cranes.

IMPORTANT:

The levels of service (light, normal, heavy, and severe) that determine the frequencies of inspections are defined differently depending on the style of crane you are operating. Use this table to find out the level of service for your **bridgestyle** crane.

Table 200-1
Service Level Definitions for Bridgestyle Cranes

Type of Crane	Normal Service	Heavy Service	Severe Service
Defined by ANSI/ASME B30.2	Service that involves operating, as a regular procedure: ✎ At less than 85% of rated load; **AND** ✎ Not more than 10 lift cycles per hour.	Service that involves operating, as a regular procedure, either: ✎ At 85% to 100% of rated load; **OR** ✎ More than 10 lift cycles per hour.	Service that involves normal or heavy service with abnormal operating conditions.
Defined by ANSI/ASME B30.11	Service that involves operation with either: ✎ Randomly distributed loads within the rated load limit; **OR** ✎ Uniform loads of less than 65% of the rated load for not more than 15% of the time of a single work shift for manually operated hoists; **OR**	Service that involves operation within the rated load limit which exceeds normal service.	

	✎ Uniform loads of less than 65% of the rated load for not more than 25% of the time of a single work shift for electric- or pneumatic-powered hoists.		
Defined by ANSI/ASME B30.17	Service that involves operation with either: ✎ Randomly distributed loads within the rated load limit; **OR** ✎ Uniform loads of less than 65% of the rated load, for no more than 15% of the time of a single work shift for manually operated cranes; **OR** ✎ Uniform loads of less than 65% of the rated load, for no more than 25% of the time of a single work shift for electric- or pneumatic-powered cranes.	Service that involves operation within the rated load limit that exceeds normal service.	

NEW SECTION

WAC 296-831-23005 Perform initial inspections on bridgestyle cranes.

You must:

✎ Make sure a designated person inspects all cranes before initial use **and** whenever the equipment has been:

- Altered.
- Repaired.
- Modified.
- Reinstalled.

Note: The designated person can limit the inspection to the areas affected by the alteration, repair, or modification.

✎ Make sure this inspection includes all items in Table 200-2, Frequent Inspection Checklist, Table 3, Periodic Inspection Checklist, and Table 4, Wire Rope Inspection.

NEW SECTION

WAC 296-831-23010 Perform frequent inspections on bridgestyle cranes.

You must:

- Make sure a designated person conducts frequent inspections as follows:
  - Inspect all items in Table 200-2, Frequent Inspection Checklist.
  - Examine any problems observed during the operation of the crane.
  - Have a designated person conduct a more detailed inspection if hazardous conditions are found.
- Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

Table 200-2
Frequent Inspection Checklist for Bridgestyle Cranes

Items to Check	How Often
Operating mechanisms for: - Proper operation. - Unusual sounds.	- Monthly for normal service.
Upper-limit device(s) for proper operation **Note:** The upper limit device is to be: - Tested with no load on the hook, and - Inched into its limit.	- Weekly to monthly for heavy service. - Daily to weekly for severe service. - Before returning to service when the crane has been idle more than one month.
Air or hydraulic systems for leakage, including: - Tanks. - Valves. - Pumps. - Lines.	
Hooks for: - Distortion, wear, or cracks. - Damaged or malfunctioning latch. - Proper rotation, if applicable.	
Hoist ropes and visible end connections for:	

✎ Distortion. ✎ Corrosion. ✎ Number of broken wires.	
Proper spooling of rope onto the drum(s) and sheave(s).	
Hoist chain for: ✎ Stretch. ✎ Gouges. ✎ Nicks. ✎ Weld spatter. ✎ Corrosion. ✎ Pitting. ✎ Discoloration.	

NEW SECTION

WAC 296-831-23015 Perform periodic inspections on bridgestyle cranes.

You must:

✎ Make sure a designated person conducts periodic inspections as follows:

– Inspect all items listed in both Table 200-2, Frequent Inspection Checklist, and Table 200-3, Periodic Inspection Checklist.

– Make sure a designated person determines whether disassembly of one or more components or pieces of equipment for additional inspection is needed as a result of any hazardous conditions found during the periodic inspection.

Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

✎ Keep current dated inspection records for periodic inspections on file.

Table 200-3
Periodic Inspection Checklist for Bridgestyle Cranes

You must: Check for evidence of	A minimum of
Deformed, cracked, or corroded members of the structures.	✎ Yearly under normal and heavy service.
Loose or missing bolts, nuts, pins, or rivets.	

Cracked or worn sheaves and drums.	✎ Quarterly under severe service. ✎ Before returning to service when the crane has been idle more than a year.	
Cracked, worn or distorted parts such as pins, bearings, wheels, shafts, gears, rollers, locking and clamping devices, bumpers, stops, switch baffles, interlock bolts, and end stops.		
Excessive wear of brake system parts.		
Excessive wear of drive chain sprockets and excessive chain stretch.		
Deterioration of controllers, master switches, contacts, limit switches/devices, and push-button stations.		
Improper operation of wind indicators.		
Improper operation of power plants.		
Problems with motion-limit devices that interrupt power or cause a warning to be activated for proper performance. Each motion must be inched or operated at low speed into the limit device with no load on the crane.		
Failure of wire rope reeving to comply with crane manufacturer's design.		
Illegibility of any function, instruction, caution, and warning labels or plates.		
Excessive wear or damage to drive tires.		
Excessive wear or deformation of lower load-carrying flange of all track sections in the system, both straight and curved.	Yearly under normal service, or as determined by a qualified engineer.	Quarterly under severe service.

NEW SECTION

WAC 296-831-23025 Inspect wire rope for bridgestyle cranes regularly.

You must:

✎ Make sure wire rope inspections are conducted as described by Table 200-3. Do one of the following if the inspection shows damaged wire rope or chain:

– Remove wire rope or chain from service;

OR

– Perform a more detailed inspection as described in Table 200-3.

✎ Keep current dated inspection records for rope inspections on file.

Table 200-4
Wire Rope Inspection Checklist

Items to Check	How Often

Running ropes for: ✎ Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires. ✎ A number of broken outside wires and the degree of distribution or concentration of such broken wires. ✎ Worn outside wires. ✎ Corroded or broken wires at end connections. ✎ Corroded, cracked, bent, worn, or improperly applied end connections. ✎ Severe kinking, crushing, cutting, or unstranding.	At least once a month; more often as the rope begins to wear.
The entire length of wire rope for: ✎ Distortion of the wire rope, such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. ✎ General corrosion. ✎ Broken or cut strands. ✎ Number, distribution, and type of visible broken wires. ✎ Reduction of wire rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.	As determined by a qualified person. This decision is to be based on such factors as: ✎ Expected rope life. ✎ Severity of environment. ✎ Percentage of capacity lifts. ✎ Frequency rates of operation. ✎ Exposure to shock loads. Inspections do not need to be at equal calendar intervals, and should be more frequent as the rope wears.

✎ Severely corroded or broken wires at end connections.	

NEW SECTION

WAC 296-831-23030 Replace wire rope on bridgestyle cranes as required.

You must:

✎ Repair or resocket wire rope when end connections develop more than one broken wire adjacent to a socketed end connection.

– Resocket an end connection only if the remaining wire rope will be long enough for full operation.

✎ Make sure wire rope when it shows ANY of the following:

– One outer wire broken at the contact point that protrudes or loops out from the rope structure.

– Wear of 1/3 the original diameter of outside individual wires.

– Kinking, crushing, birdcaging, or any other damage resulting in distortion of rope structure.

– Evidence of heat damage from any cause.

– Running rope with:

✂ Twelve randomly distributed broken wires in one lay.

✂ Four broken wires in one strand in one lay.

– Reduction from nominal diameter greater than the manufacturer's recommendation.

✂ If manufacturer's recommendations are not available, refer to Table 200-5.

✎ Have a qualified person determine when to replace wire rope:

– Immediately.

– At the end of the work shift.

– Before the next use of the crane.

✎ Make sure replacement wire rope and connections are the same size, type, grade, construction and strength unless specified otherwise by either:

– The rope, crane, or hoist manufacturer;

OR

– A qualified person.

Table 200-5
Allowed Nominal Reduction of Rope

Nominal Diameter	Maximum Allowable Reduction From Rope Diameter

Up to 5/16 in. (8 mm)	1/64 in. (0.4 mm)
Over 5/16 in. to 1/2 in. (13 mm)	1/32 in. (0.8 mm)
Over 1/2 in. to 3/4 in. (19 mm)	3/64 in. (1.2 mm)
Over 3/4 in. to 1 1/8 in. (29 mm)	1/16 in. (1.6 mm)
Over 1 1/8 in. to 1 1/2 in. (38 mm)	3/32 in (2.4 mm)

NEW SECTION

WAC 296-831-23035 Maintain and store wire rope for bridgestyle cranes safely.

You must:

✎ Unreel or uncoil wire rope in a way that avoids twisting or kinking the rope.

– Avoid dragging the rope in dirt or around objects that will scrape, nick, crush, or induce sharp bends in the rope.

✎ Take precautions to prevent wire rope strands from unraveling before you cut the rope.

✎ Make sure any lubricant used:

– Is compatible with the original lubricant.

– Does not hinder the visual inspection of the rope.

Note: Wire rope should be maintained in a well-lubricated condition, giving special attention to sections that are hidden.

NEW SECTION

WAC 296-831-23040 Replace chain as required.

You must:

✎ Follow the requirements in Table 200-6 for replacing chain.

Table 200-6
Chain Replacement Criteria

Type of Chain	You must: Follow these requirements for replacing chain
Any chain	✎ Make sure ALL of these apply when replacing chain:

	– Replacement chain is the same size, grade and construction as the original chain, unless otherwise recommended by the hoist manufacturer or a qualified person. – There is no twist between the hoist and an anchored end on either the loaded side or slack side. – Mating parts (sprockets, guides, stripper) are disassembled and inspected for wear. – Discarded load chains are not used for slings.
Welded link chain	✎ When it has stretched beyond the hoist manufacturer's recommended length. – If you do not have the manufacturer's recommendations, replace the chain when it is: ✂ 2 1/2% longer than unused chain, for hand-operated hoists. ✂ 1 1/2% longer than unused chain, for powered hoists.
Roller chain	✎ When inspection shows: – Twist in any 5 ft. section exceeds 15 degrees. – Chain has a side bow in plane perpendicular to the plane of the roller that exceeds 1/4 inch in any 5 ft. section. – Chain has stretched beyond the hoist manufacturer's recommendation. **Note:** If the hoist manufacturer's recommendation is not available, you should do the following: – Determine the nominal pitch of your chain. – Measure a 12 inch section that normally travels over the chain sprocket. – Measure the dimension from the edge of one chain pin to the corresponding edge of another pin with a caliper-type gauge. – Replace chain if the measured section is more than 1/4 inch longer than the nominal pitch. ✎ Make sure ALL of these apply when replacing roller chain: – Replacement chain is the same size, grade, and construction as the original chain unless otherwise recommended by the hoist manufacturer or a qualified person.

	– Mating parts (sprockets, guides, stripper) are disassembled and inspected for wear and replaced if necessary. – Chain is reeved as outlined in the hoist manufacturer's manual or as recommended by a qualified person. – Discarded roller chains are not used for slings.

NEW SECTION

WAC 296-831-23045 Establish and follow safe maintenance and repair procedures for bridgestyle cranes.

You must:

(1) Make sure only designated persons perform maintenance tasks including adjusting, repairing, and replacing crane parts.

(2) Make sure ALL of the following are done BEFORE performing maintenance, adjustments, or repairs on a **crane or hoist:**

- Move the crane to a location resulting in the least interference with other cranes, carriers, or operations.
- Set the load down.
- Place controllers in the "OFF" position.
- Install a guard or barrier between adjacent runways for the length of the work area to prevent contact between maintenance workers and a crane on the adjacent runway.

Reference: See additional requirements in chapter 296-24 WAC, Part A-4, Controlling hazardous energy, when performing maintenance, adjustments or repairs.

You must:

(3) Make sure ALL of the following are done BEFORE performing maintenance on a **crane system**, including the crane runway, its support structure, runway conductor systems or areas in the path of travel of the crane bridge or trolley:

- Place warning signs and barriers on the floor beneath the work area if the overhead work creates a hazard.
- Install a guard or barrier between adjacent runways for the length of the work area to prevent contact between persons performing maintenance and a crane on the adjacent runway.

(4) Make sure either of the following are done if the runway will be used by other cranes during maintenance:

- Use stops to prohibit an active crane from contacting:
  - The idle crane.
  - Maintenance workers.
  - Maintenance equipment.

OR

– Provide a dedicated signal person at a visual vantage point for observing the approach of other cranes.

NEW SECTION

WAC 296-831-23050 Lubricate parts safely.

You must:

✎ Do the following when lubricating a crane. Make sure:

– Machinery is stationary while it is being lubricated.

Exceptions: ✂ Machinery does not need to remain stationary while it is being used to lubricate runways or other parts of the crane system.

✂ Wire rope does not need to remain stationary if it is necessary to move it to lubricate it effectively in accordance with the manufacturer's recommendations.

– The crane does not interfere with other cranes, carriers, or operations.

– A load is not attached to the crane.

– Controllers are in the "OFF" position.

Note: Manufacturer's recommendations, or those of a qualified person, should be followed when lubricating all moving and controller crane parts.

NEW SECTION

WAC 296-831-23055 Repair or replace hooks on bridgestyle cranes as required.

You must:

✎ Make sure a qualified person determines if a damaged hook needs to be replaced or can be repaired.

✎ Repair or replace a hook when it shows:

– Cracks, nicks or gouges.

– Wear of more than ten percent of the original sectional dimension, or as recommended by the manufacturer.

– A bend or twist exceeding ten degrees from the plane of the unbent hook.

– An increase in the throat opening of more than fifteen percent of the original sectional dimension, or as recommended by the manufacturer.

✎ Follow these requirements when repairing a hook:

– Only a designated person can repair cracks, nicks and gouges.

– Grind longitudinally.

– Follow the contour of the hook.

– The dimension of the hook must NOT be reduced more than ten percent of its original value, unless otherwise recommended

by the manufacturer.

NEW SECTION

WAC 296-831-23060 Perform operational tests on bridgestyle cranes.

You must:

✎ Make sure operational tests are performed on new and altered cranes. Testing must include:

- Hoisting and lowering.
- Trolley travel.
- Bridge travel.
- Limit switches, locking and safety devices.

✎ Determine the trip setting of hoist limit switches as follows:

- Use an empty hook.
- Make a series of runs at increasing hook speeds, up to the maximum speed.

✎ Locate the actuating mechanisms of the limit switch so it will trip under all conditions, soon enough to prevent contact of the hook or load block with any part of the trolley.

NEW SECTION

WAC 296-831-240 Operating bridgestyle cranes.

Summary:

Your responsibility:

To make sure bridgestyle cranes are operated safely.

You must:

Allow bridgestyle cranes to be operated only by specific people
WAC 296-831-24005.
Attach the load to bridgestyle cranes correctly
WAC 296-831-24010.
Operate bridgestyle cranes safely
WAC 296-831-24015.
Perform planned engineered lifts correctly
WAC 296-831-24020.

NEW SECTION

WAC 296-831-24005 Allow bridgestyle cranes to be operated only by specific people.

You must:

✎ Make sure only these people operate a crane:

– Designated persons who have successfully passed a practical operating exam for the specific type of equipment they will operate.

– Trainees, under the direct supervision of a designated person.

– Crane inspectors.

– Maintenance and test personnel, with the knowledge of the operator or other designated person.

NEW SECTION

WAC 296-831-24010 Attach the load to bridgestyle cranes correctly.

You must:

(1) Make sure the load is within the specifications of the load rating chart, except for load testing or planned engineered lifts done according to WAC 296-831-24030.

(2) Make sure the load lines and attachments meet the following:

– Keep the hoist rope from kinking or wrapping around the load.

– Keep multiple part lines from twisting around each other.

– Bring the hook over the load in a way that prevents swinging.

– Attach the load to the hook with slings or other approved devices.

– Secure the load and balance it before lifting more than a few inches.

– Balance the load so no units exceed their rated load capacity, when using multiple hoisting units.

NEW SECTION

WAC 296-831-24020 Operate bridgestyle cranes safely.

You must:

(1) Make sure one qualified person is in charge of any lift that will use two or more cranes. The qualified person must instruct the other operators about:

- Proper positioning.
- Rigging the load.
- Movements to be made.

(2) Make sure the operator consults with their supervisor whenever they have a question about the safety of handling any load.

- Make sure the crane operator notifies the supervisor and the next operator of any uncorrected defect in the crane.

(3) Make sure the operator doesn't engage in any practice that diverts their attention while actually engaged in operating equipment.

(4) Make sure the operator obeys any stop signal given by any worker.

(5) Make sure the operator does NOT allow anyone to ride on the load or hook.

(6) Make sure during lifting, a load doesn't:

- Suddenly accelerate or decelerate.
- Contact any obstruction.

(7) Make sure the crane operator contacts runway stops or other cranes and carrier with both:

- Extreme caution.

AND

- After notifying people on the other crane.

(8) Make sure the operator does not lower a load below the point where only two wraps of wire rope remain on each anchorage of the hoisting drum.

(9) Make sure the operator opens the magnet switch when a ground person requests it, and signals them that the magnet has been deenergized.

(10) Make sure the operator closes the main switch (crane disconnect) only when:

- No one is on or adjacent to the crane or carrier.
- All controllers are in the "OFF" position.

(11) Make sure the crane operator activates the warning device on cab-, remote-, and, when provided, floor-operated cranes:

- Before starting the bridge or trolley in motion.

✎ When approaching people in the path of the load.

(12) Make sure the operator immediately places all controllers in the "OFF" position whenever power is lost during operation.

✎ Make sure that the operating motions are checked for proper direction after power is restored.

(13) Make sure the operator does the following when the wind alarm of an outdoor crane has sounded:

✎ Discontinues operation of the crane.

✎ Prepares and stores the crane for excessive wind conditions.

(14) Make sure the operator does NOT use a hoist-limit device as an operating control, unless other means are used to prevent damage to the hoist block by overtravel.

(15) Make sure the crane operator does the following before leaving a cab-operated crane or carrier unattended:

✎ Sets the load down.

✎ Places controllers or master switches in the "OFF" position.

✎ Deenergizes:

- The main switch of the specific crane or carrier.
- The runway disconnect if all cranes on the runway will be unattended for longer than one shift.

NEW SECTION

WAC 296-831-24025 Perform planned engineered lifts correctly.

You must:

Make sure planned engineered lifts are done as follows:

✎ Only cranes with a load rating of five tons or above may be used.

✎ The load must not exceed one hundred twenty-five percent of the rated load, unless the crane manufacturer is consulted and approves otherwise.

✎ No more than two lifts are to be done in a twelve-month period with any crane, unless the crane manufacturer is consulted and approves otherwise.

✎ Prepare a written review of the crane service history, including:

- Reference to previous planned engineered lifts.
- Structural repairs.
- Modifications of original design.

✎ The design of the crane-supporting structure must be reviewed and approved by a qualified person. The support must

be inspected and any deterioration or deformation taken into consideration.

✎ The crane must be given a periodic inspection just before making the lift.

✎ A designated person will direct the lift, under controlled conditions, in accordance with a previously prepared lift plan.

✎ All people in the area must be alerted that the lift is being made.

✎ The operator must test the crane by lifting the load a short distance and setting the brakes. The lift is to continue ONLY if the brakes stop and hold the load. Correct any failure to hold the load before proceeding with the lift.

✎ Perform a periodic inspection after the lift is completed, before using the crane to lift any other load.

✎ Keep records of the lift on file, including:

- Calculations.
- Inspections.
- All distances moved.

NEW SECTION

WAC 296-831-300 Mobile cranes.

Introduction:

WAC 296-831-300 through 296-831-340 apply to all mobile cranes. Mobile cranes are powered by internal combustion engines or electric motors and are mounted on a mobile chassis.

The major types of mobile cranes are:

✎ Locomotive cranes.

✎ Crawler cranes.

✎ Wheel-mounted cranes.

✎ Articulating cranes.

You may have other variations of these cranes in your workplace not listed here but covered by these requirements.

Articulating cranes are often equipped with a load hoist mechanism to increase their usefulness. This section also covers load hoist mechanism equipped machines. The requirements of this section apply only when these machines are used as lifting cranes.

Exemptions: The following are exempt from this book:

✎ Cranes with a maximum rated capacity of one ton or less.

✎ Digger derricks.

✎ Side-boom tractors.

✎ Cranes specifically for energized electrical line service.

✎ Trolley boom cranes.

✎ Cranes designed for railway and automobile wreck clearance.

✎ Articulating boom cranes of the following types:

– With booms made of nonconductive materials.

– Designed primarily for personnel lifting.
– Equipped with nonlifting attachments.
– Used in forestry and logging.
– Used solely as scrap and material handlers.

NEW SECTION

WAC 296-831-310 Design and installation requirements for mobile cranes.

Summary:

Your responsibility:

To make sure mobile cranes are safe for operation.

You must:

Make sure equipment meets appropriate design and construction requirements of this rule

WAC 296-831-31005.

Have rated capacity charts available

WAC 296-831-31010.

Maintain booms in a safe operating condition

WAC 296-831-31015.

Provide two-blocking protection on mobile cranes

WAC 296-831-31020.

Provide fire extinguishers

WAC 296-831-31025.

Store personal and work materials properly

WAC 296-831-31030.

NEW SECTION

WAC 296-831-31005 Make sure equipment meets appropriate design and construction requirements of this rule.

You must:

✎ Make sure all cranes in use prior to March 1, 2004, meet the design, construction and stability requirements as defined by the appropriate American National Standard Institute regulation, either:

– USAS B30.5 - 1968, Crawler, Locomotive and Truck Cranes;

OR

– ASME/ANSI B30.2 - 1986, Articulating Boom Cranes.

✎ Make sure all new cranes acquired for use on or after May 1, 2004, meet the design, construction, and stability requirements as defined in either:

– ASME B30.5 - 2000, Mobile and Locomotive Cranes, including addenda A - 2002;

OR

– ASME B30.22 - 2000, Articulating Boom Cranes.

NEW SECTION

WAC 296-831-31010 Have rated capacity charts available.

You must:

✎ Make sure a durable and legible rated capacity chart for all mobile cranes is readily available to the operator while at the controls. This chart must:

– Include the manufacturer's rated capacity at all operating radii for all permissible boom and jib lengths and configurations.

– Show alternate ratings for optional equipment affecting the ratings.

– Show recommended reeving for hoist lines.

NEW SECTION

WAC 296-831-31015 Maintain booms in safe operating condition.

You must:

✎ Make sure boom support hydraulic cylinders have an integrally mounted holding device to prevent uncontrolled lowering of the boom, if the hydraulic system fails.

Note: A load hold check valve meets this requirement.

Exemption: The following requirements do not apply to articulating cranes.

You must:

✎ Make sure your crane has:

– Boom stops to provide resistance if the boom falls backwards. Stops can be:

✂ A fixed or telescoping bumper.

✂ A shock absorbing bumper.

✂ Hydraulic boom elevation cylinders.

– Restraints that keep jibs from falling backwards.

– Boom angle or radius indicators readable from the operator's station.

– Means of automatically stopping the hoist when the boom reaches a predetermined high angle. This can be either:

✂ A boom hoist disconnect;

✂ A shutoff;

OR

✂ Hydraulic relief.

– A boom length indicator, if using telescoping booms, readable from the operator's station.

Note: If the load rating is independent of the boom length, a boom length indicator is not needed.

NEW SECTION

WAC 296-831-31020 Provide two-blocking protection on mobile cranes.

You must:

✎ Make sure two-blocking damage prevention features are provided on:

– Telescopic boom cranes

AND

– Articulating cranes with a winch.

✎ Make sure lattice boom cranes have either:

– An anti-two-block device;

OR

– A two-block warning feature.

NEW SECTION

WAC 296-831-31025 Provide fire extinguishers.

You must:

Provide each crane with a BC fire extinguisher that can be easily accessed by the operator.

Reference: See additional requirements relating to portable fire extinguishers in WAC 296-800-300, Portable fire extinguishers, found in the safety and health core rules.

NEW SECTION

WAC 296-831-31030 Store personal and work materials properly.

You must:

✎ Make sure clothing, personal belongings, tools, and other

necessary articles are stored so they do not interfere with access to the crane or its operation.

NEW SECTION

WAC 296-831-320 Hoisting equipment for mobile cranes.

Summary:

Your responsibility:

To make sure hoisting equipment on mobile cranes is used correctly.

You must:

Use and maintain sheaves on mobile cranes properly WAC 296-831-32005.

Follow these requirements when using hoisting ropes on mobile cranes WAC 296-831-32010.

Use reeving accessories on mobile cranes correctly WAC 296-831-32015.

Use hooks on mobile cranes correctly WAC 296-831-32020.

NEW SECTION

WAC 296-831-32005 Use and maintain sheaves on mobile cranes properly.

You must:

✎ Make sure sheave grooves are free from surface defects that could damage the rope.

✎ Make sure guards are in place to:

- Guide the rope back into the sheave groove, when using ropes that can be momentarily unloaded.

- Prevent ropes from becoming fouled when the block is lying on the ground with loose ropes.

NEW SECTION

WAC 296-831-32010 Follow these requirements when using hoisting ropes on mobile cranes.

You must:

✎ Follow these requirements when using hoisting ropes:

– Use only wire ropes recommended by either the rope or crane manufacturer, or a qualified person.

– Do not use rotation resistant or fiber core rope for boom hoist reeving.

– Follow the rope or fitting manufacturer's specifications when socketing.

– Make sure tension is equal in all parts of the rope, if more than one part is used to support the load.

NEW SECTION

WAC 296-831-32015 Use reeving accessories on mobile cranes correctly.

You must:

✎ Make sure eye splices are made according to the manufacturer's recommendations.

✎ Make sure wire rope clips are:

– Made from dropforged steel, not malleable cast iron.

– Single saddle (U-bolt) or double saddle.

– Used according to the clip manufacturer's recommendations for spacing, number of clips, and tightened evenly to the recommended torque values.

– Attached with the U-bolt over the dead end of the rope and the live rope resting in the saddle, when using U-bolts.

Place illustration here.

– Retightened after the initial load is applied to the rope, and periodically during use to compensate for decrease in rope diameter.

✎ Make sure swaged, compressed, or wedge socket fittings are applied as recommended by either:

– The rope, crane, or fitting manufacturer;

OR

– A qualified person.

✎ Make sure new poured sockets or swaged socket assemblies for boom pendants are proof tested to the lower of the following:

– Fifty percent of the nominal strength of the component wire rope or structural strand.

– The manufacturer's recommendation.

✎ Attach wire rope clips only to the unloaded dead end of the rope when using with wedge sockets.

Note: Piggyback-style clips can be used if the manufacturer's instructions are followed. See Illustration 2.

Place illustration here.

NEW SECTION

WAC 296-831-32020 Use hooks on mobile cranes correctly.

You must:

✎ Make sure hooks:

– Are either latched, with the latch bridging the throat opening of the hook, or are moused.

– Meet the manufacturer's recommendations.

– Are not overloaded.

NEW SECTION

WAC 296-831-330 Inspections, maintenance and testing for mobile cranes.

Summary:

Your responsibility:

To keep mobile cranes in safe operating condition by

performing regular inspections, and maintenance, and testing.

You must:

Perform initial inspections on mobile cranes WAC 296-831-33005.

Perform frequent inspections on mobile cranes WAC 296-831-33010.

Perform periodic inspections on mobile cranes WAC 296-831-33015.

Inspect wire rope for mobile cranes regularly WAC 296-831-33020.

Replace wire rope on mobile cranes as required WAC 296-831-33025.

Maintain and store wire rope for mobile cranes safely WAC 296-831-33030.

Refuel mobile cranes properly WAC 296-831-33035.

Establish and follow safe maintenance and repair procedures for mobile cranes WAC 296-831-33040.

Repair or replace hooks on mobile cranes as required WAC 296-831-33045.

Perform testing WAC 296-831-33050.

NEW SECTION

WAC 296-831-33005 Perform initial inspections on mobile cranes.

You must:

✎ Make sure a designated person inspects cranes before initial use **and** whenever the equipment has been:

- Altered.
- Repaired.
- Modified.

Note: The designated person can limit the inspection to the areas affected by the alteration, repair or modification.

You must:

✎ Make sure this inspection includes all items in Table 300-1, Frequent Inspection Checklist, Table 300-2, Periodic Inspection Checklist, and Table 300-3, Wire Rope Inspection.

NEW SECTION

WAC 296-831-33010 Perform frequent inspections on mobile cranes.

You must:

✎ Make sure a designated person conducts frequent inspections as follows:

– Inspect all items in Table 300-1, Frequent Inspection Checklist.

– Examine any problems observed during the operation of the crane.

– Carefully examine any identified deficiencies, determining whether they constitute a safety hazard.

✎ Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

✎ Keep readily available monthly written, dated, and signed inspection reports on all critical items in use such as brakes and hooks.

Table 300-1
Frequent Inspection Checklist for Mobile Cranes

Items to Check	How Often
Operational aids for: ✎ Malfunction.	✎ Daily, when used. ✎ Before putting into service when the crane has been idle one month or more. ✎ Twice a year for standby cranes. **Note:** If operational aids are not working, follow the manufacturer's recommendations. If manufacturer's recommendations are not available, have: ✎ A qualified person determine if repair or recalibration is needed. ✎ The lift supervisor establish procedures for working without the aids.
Control mechanisms for: ✎ Maladjustments that interfere with proper operation.	✎ Daily, when used.

	✎ Before putting into service when the crane has been idle one month or more ✎ Twice a year for standby cranes
Air or hydraulic systems for: ✎ Deterioration. ✎ Leakage. ✎ Proper oil level.	
Control mechanisms for: ✎ Wear of components. ✎ Contamination by lubricants.	✎ At least once a month. ✎ Before putting into service when the crane has been idle one month or more. ✎ Twice a year for standby cranes.
Safety devices for: ✎ Malfunction.	
Hooks for: ✎ Deformation. ✎ Chemical damage. ✎ Cracks. ✎ Wear.	
Rope reeving for: ✎ Compliance with manufacturer's recommendations.	
Electrical equipment for: ✎ Malfunction. ✎ Deterioration. ✎ Dirt. ✎ Moisture.	
Tires for: ✎ Inflation pressure. ✎ Cuts. ✎ Loose nuts.	

NEW SECTION

WAC 296-831-33015 Perform periodic inspections on mobile cranes.

You must:

✎ Make sure a designated person conducts periodic inspections as follows:

– Inspect all items listed in both Table 300-1, Frequent Inspection Checklist, and Table 300-2, Periodic Inspection Checklist.

– Carefully examine any identified deficiencies to determine whether they constitute a safety hazard.

✎ Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

Table 300-2
Periodic Inspection Checklist for Mobile Cranes

Items to Check	How Often
Deformed, cracked, or corroded members in the crane structure and boom.	
Bolts and rivets for tightness.	
Sheaves and drums for: ✎ Cracks. ✎ Wear.	
Parts such as pins, bearings, shafts, gears, rollers, and locking devices for: ✎ Wear. ✎ Cracks. ✎ Distortion.	
Brake and clutch systems for: ✎ Wear.	✎ At least once a year;
Indicators (load, boom angle, etc) for: ✎ Accuracy.	**OR**
Power plants: ✎ Proper performance.	✎ As recommended by the manufacturer;

✎ Compliance with safety requirements.	**OR**
Chain drive sprockets for: ✎ Wear. ✎ Chain stretch.	✎ More frequently, if any of the following conditions call for it: – Activity. – Severity of service. – Environmental conditions.
Steering, braking, and locking devices for: ✎ Malfunction.	
Hydraulic and pneumatic hose, fittings, and tubing for: ✎ Evidence of leakage at the surface of the flexible hose or its junction with metal end couplings. ✎ Blistering or abnormal deformation to the outer covering of the hydraulic or pneumatic hose. ✎ Leakage at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures. ✎ Evidence of excessive abrasion or scrubbing on the outer surface of a hose, rigid tube, or fitting.	
Hydraulic and pneumatic pumps and motors for: ✎ Loose bolts or fasteners. ✎ Leaks at joints between sections. ✎ Shaft seal leaks. ✎ Unusual noises or vibration. ✎ Loss of operating speed. ✎ Excessive heating of the fluid. ✎ Loss of pressure.	
Hydraulic and pneumatic valves for: ✎ Cracks in valve housing.	

✎ Improper return of spool to neutral position. ✎ Leaks at spools or joints. ✎ Sticking spools. ✎ Failure of relief valves to attain or maintain correct pressure setting. ✎ Relief valve pressures.	
Hydraulic and pneumatic cylinders for: ✎ Drifting caused by fluid leaking across piston. ✎ Rod seals leaking. ✎ Leaks at welded joints. ✎ Scored, nicked, or dented cylinder rods. ✎ Dented case (barrel). ✎ Loose or deformed rod eyes or connecting joints.	
Hydraulic filters for: ✎ Evidence of rubber particles. ✎ Metal chips or pieces on the filter.	

NEW SECTION

WAC 296-831-33020 Inspect wire rope for mobile cranes regularly.

You must:

✎ Make sure wire rope inspections are conducted by a designated person as described by Table 300-3.

✎ Do one of the following if the inspection shows damaged wire rope:

- Remove wire rope from service.
- Perform a more detailed inspection as described in Table 300-3.

Table 300-3
Wire Rope Inspection Checklist

Items to Check:	How Often:
Running ropes for: ✎ Distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. ✎ General corrosion. ✎ Broken or cut strands. ✎ Number, distribution, and type of visible broken wires. ✎ Core failure in rotation resistant ropes.	At least once a month: More often as the rope begins to wear.
The entire length of wire rope for: ✎ Distortion of the rope, such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion. ✎ General corrosion. ✎ Broken or cut strands. ✎ Number, distribution, and type of visible broken wires. ✎ Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires. ✎ Severely corroded or broken wires at end connections.	At least once a year. **Note:** Wire rope inspections do not need to be at equal calendar intervals, and should be more frequent as the rope gets older.

NEW SECTION

WAC 296-831-33025 Replace wire rope as required.

You must:

✎ Make sure wire rope is replaced when it shows **ANY** of the following:

– One outer wire broken at the contact point with the core of the rope, which protrudes or loops out from the rope structure.

– Wear of one-third the original diameter of outside individual wires.

– Kinking, crushing, birdcaging, or any other damage resulting in distortion of rope structure.

– Evidence of heat damage from any cause.

– **Running rope** with:

✂ Six randomly distributed broken wires in one lay.

✂ Three broken wires in one strand in one lay.

– **Standing rope:**

✂ With more than two broken wires in one lay in sections beyond end connections.

✂ With more than one broken wire at an end connection.

– **Rotation resistant rope:**

✂ With two randomly distributed broken wires in six rope diameters.

✂ With four randomly distributed broken wires in thirty rope diameters.

– Any ropes if the reduction from the nominal diameter of the rope is greater than shown in Table 300-6.

You must:

✎ Have a qualified person determine when to replace wire rope:

– Immediately.

– At the end of the work shift.

– Before the next use of the crane.

✎ Make sure replacement rope and connections are the same size, type, grade, construction and strength as that specified by the hoist manufacturer, unless the rope, crane or hoist manufacturer, or a qualified person specifies otherwise.

Table 300-4
Allowed Reduction from Nominal Diameter

Nominal Diameter	Maximum Allowable Reduction From Rope Diameter

Up to 5/16 in. (8 mm)	1/64 in. (0.4 mm)
Over 5/16 in. to 1/2 in. (13 mm)	1/32 in. (0.8 mm)
Over 1/2 in. to 3/4 in. (19 mm)	3/64 in. (1.2 mm)
Over 3/4 in. to 1 1/8 in. (29 mm)	1/16 in. (1.6 mm)
Over 1 1/8 in. to 1 1/2 in. (38 mm)	3/32 in. (2.4 mm)

NEW SECTION

WAC 296-831-33030 Maintain and store wire rope for mobile cranes safely.

You must:

✎ Unreel or uncoil wire rope as recommended by the manufacturer. Avoid twisting or kinking the rope.

✎ Take the following precautions to prevent wire rope strands from unraveling before you cut the rope:

– For preformed rope, place one seizing on each side of the cut.

– For nonpreformed rope 7/8 inch in diameter or smaller, place two seizings on each side of the cut.

– For nonpreformed rope 1 inch in diameter or larger, place three seizings on each side of the cut.

✎ Avoid dragging the rope in dirt or around objects that can scrape, nick, crush, or make sharp bends in the rope.

✎ Make sure any lubricant used:

– Is compatible with the original lubricant.

– Doesn't hinder the visual inspection of the rope.

Note: Wire rope should be maintained in a well-lubricated condition, giving special attention to sections that are hidden.

NEW SECTION

WAC 296-831-33035 Refuel mobile cranes properly.

You must:

✎ Refuel equipment as follows:

– Make sure the engine is turned off before refueling.

– When using portable containers for refueling, make sure only an approved safety-type can with an automatic closing cap and flame arrester is used.

NEW SECTION

WAC 296-831-33040 Establish and follow safe maintenance and repair procedures for mobile cranes.

You must:

(1) Make sure only designated persons perform maintenance tasks including adjusting, repairing, and replacing crane parts.

(2) Make sure the following precautions, when they apply, are taken **before** performing adjustments or repairs on a crane:

- Move the crane to a location where it will cause the least amount of interference with other equipment.
- Place controllers in the "OFF" or "neutral" position.
- Take steps to make sure the crane cannot be accidentally started.
- Place warning or "out of order" signs on the crane controls.
- Lower the boom to the ground if possible.
- ✂ If not possible, secure the boom against dropping.
- Relieve hydraulic oil pressure from all hydraulic circuits, when working on hydraulic components.
- Use blue flag protection for locomotive cranes.

(3) Make sure the following things are done **before** returning the crane to service after making adjustments and repairs:

- Reinstall all guards.
- Remove trapped air from the hydraulic system, if required.
- Reactivate safety devices.
- Remove maintenance equipment.
- Have authorized personnel remove signs or flags.

NEW SECTION

WAC 296-831-33045 Repair or replace hooks on mobile cranes as required.

You must:

- Make sure a qualified person determines if a damaged hook needs to be replaced or can be repaired.
- Repair or replace a hook when it shows:
- Cracks, nicks or gouges.
- Wear of more than ten percent of the original sectional

dimension, or as recommended by the manufacturer.

– A bend or twist exceeding ten degrees from the plane of the unbent hook.

– An increase in the throat opening of more than fifteen percent of the original sectional dimension, or as recommended by the manufacturer.

✎ Follow these requirements when repairing a hook:

– Only a designated person can repair cracks, nicks and gouges.

– Grind longitudinally.

– Follow the contour of the hook.

– The dimension of the hook must NOT be reduced more than ten percent of its original value, unless otherwise recommended by the manufacturer.

NEW SECTION

WAC 296-831-33050 Perform testing on repaired or altered cranes.

You must:

✎ Make sure a rated load test is performed on cranes whose load-bearing parts have been repaired or altered.

– A written report must be prepared and kept on file, showing test procedures.

– If load tests are done, loads must not exceed one hundred ten percent of the manufacturer's load rating.

NEW SECTION

WAC 296-831-340 Operating mobile cranes.

Summary:

Your responsibility:

To make sure mobile cranes are operated safely.

You must:

Allow mobile cranes to be operated only by specific people WAC 296-831-34005.

Make sure mobile crane operators pass examinations and evaluations WAC 296-831-34015.

Attach the load correctly on mobile cranes WAC 296-831-34016.

Operate mobile cranes safely

WAC 296-831-34020.
Move the crane correctly
WAC 296-831-34025.

IMPORTANT:

If you operate your equipment near power lines, you will need to follow the requirements in chapter 296-24 WAC, Part L.

NEW SECTION

WAC 296-831-34005 Allow mobile cranes to be operated only by specific people.

You must:

✎ Make sure only these people operate a crane:

- Designated persons who have successfully passed the examinations detailed in WAC 296-831-34015.
- Trainees under the direct supervision of a designated person.
- Crane inspectors.
- Maintenance and test personnel, with the knowledge of the operator or other designated person.

NEW SECTION

WAC 296-831-34015 Make sure mobile crane operators pass examinations and evaluations.

You must:

✎ Make sure operators successfully pass a written and verbal test that demonstrates their ability to correctly use the crane load/capacity charts.

Note: This test must cover the different crane configurations the operator will encounter. Written exams can be administered by either the employer or a third party.

You must:

✎ Make sure operators successfully pass a written examination that covers:

- Operational characteristics for the type of crane.
- Performance specifications for the type of crane.
- Crane controls.
- Responses to emergencies such as fire, contact with power lines, loss of stability or control malfunction.

Exemption: Operators of articulating boom cranes are not required to pass written exams.

✎ Make sure operators demonstrate the ability to read, understand and apply:

- Load capacity charts.

– Operation manuals.
– Maintenance manuals.
– Emergency procedures.
– Applicable safety regulations.

✎ Make sure operators successfully pass a practical operating examination for the specific type of crane they will operate. This test must include:

– Prestart inspection.
– Familiarity with crane controls.
– Operating procedures.
– Maneuvering skills.
– Shutdown.
– Poststart inspection.
– Securing procedures.

NEW SECTION

WAC 296-831-34016 Attach the load correctly on mobile cranes.

You must:

(1) Make sure the load is within the specifications of the load-rating chart, except for load testing.

(2) Make sure the crane is level, blocked properly, and cribbing is in place, where necessary.

(3) Make sure the load lines and attachments meet the following:

✎ Keep the hoist rope from kinking or wrapping around the load.

✎ Keep multiple part lines from twisting around each other.

✎ Bring the hook over the load in a way that prevents swinging.

✎ Attach the load to the hook with slings or other approved devices.

✎ Secure the load and balance it before lifting more than a few inches.

✎ Properly seat the rope on the drum and in the sheaves, if there is a slack rope condition.

(4) Make sure tag or restraint lines are used when rotation of the load is hazardous.

(5) One designated person is responsible for the operation when two or more cranes are used. That person must:

✎ Analyze the operation.

✎ Instruct all personnel about the proper positioning, rigging, and moving of the load.

NEW SECTION

WAC 296-831-34020 Operate mobile cranes safely.

You must:

(1) Make sure the operator tests the controls at the start of each shift.

✎ If any controls don't operate properly, they must be adjusted or repaired before beginning operations.

(2) Make sure the operator tests the brakes **every** time a load approaching the rated load is handled by raising the load a few inches and then applying the brakes.

(3) Make sure the crane operator consults with the supervisor whenever there are any safety questions before handling the load.

(4) Make sure the operator doesn't engage in any practice that diverts their attention while actually engaged in operating equipment.

(5) Make sure during lifting:

✎ The load doesn't suddenly accelerate or decelerate.

✎ The load doesn't contact any obstructions.

(6) Make sure the operator engages the boom-hoist pawl or other locking device when operating at a fixed radius.

(7) Make sure the operator knows when ropes are being handled on a winch head.

✎ Make sure the operator stays within convenient reach of the power unit control lever while the winch head is being used.

(8) Make sure the operator activates the positive controllable means to keep the drum from rotating in the lowering direction when the load is going to remain suspended for a considerable length of time.

(9) Make sure the operator rotates the crane:

✎ Without sudden starts or stops.

✎ At a speed that does not cause the load to swing out beyond a controllable radius.

(10) Make sure the operator does **NOT** perform side-pulls, except when loads are freely suspended.

(11) Make sure the operator does not allow anyone to ride on the load or hook.

(12) Make sure the operator does not lower the boom or the load to where less than two full wraps of rope are on the drum.

(13) Make sure the operator does not use rail clamps as a way of restraining a locomotive crane from tipping.

(14) Make sure the ballast or counterweight recommended by the manufacturer is not exceeded.

(15) Make sure outriggers and stabilizers, when required, are used according to manufacturer's recommendations.

✎ Blocking and cribbing used to support outriggers and stabilizers must be:

- Strong enough to prevent crushing.
- Free from defects.
- Big enough to support their load.

(16) Make sure the operator does the following any time the power fails:

✎ Sets all brakes and locking devices.

✎ Moves all clutches and power controls to the off or neutral position.

✎ Sets down any suspended load under brake control, if practical.

(17) Make sure the operator does not leave the controls while a load is suspended.

Exemption: Articulating cranes are exempt from this requirement when specific precautions have been taken to eliminate employee exposure to hazards.

NEW SECTION

WAC 296-831-34025 Move the crane correctly. Moving the crane with a load.

You must:

✎ Make sure a designated person determines and controls the safety of moving a crane with a load. They are responsible for making decisions about:

- Position of the load.
- Boom location.
- Ground support.
- Travel route.
- Speed of movement.

Moving the crane without a load.

You must:

✎ Make sure, when the crane is moved over roads:

- The crane is moved according to the manufacturer's recommendation.
- The boom is carried in line with the direction of motion.
- The superstructure is secured against rotation, unless:

✂ There is an operator in the cab when turning.

✂ The boom is supported on a dolly.

✂ The empty hook cannot swing freely.

NEW SECTION

WAC 296-831-400 Tower, portal and pedestal cranes.

Introduction:

WAC 296-831-400 through 296-831-440 apply to these cranes:

- Pedestal.
- Portal.
- Tower.

Exemption: Cranes used for construction, or those frequently disassembled, are not covered by this rule.

In this rule, job duties are assigned to either designated personnel, employees under the direction of designated personnel, or qualified personnel. Use Table 1 for guidance on which duties need specific personnel to perform them.

Table 400-1
Roles of Designated and Qualified Persons For Tower, Portal and Pedestal Cranes

Activity	Performed By		
	Designated Personnel	Someone under the direction of a Designated Person	Qualified Person
Initial inspection			X
Frequent inspection	X		
Periodic inspection	X		
Operational testing		X	
Rated load testing		X	
Repairs and adjustments	X		

NEW SECTION

WAC 296-831-410 Design and installation requirements for tower, portal and pedestal cranes.

Your responsibility:

To make sure your tower, portal and pedestal cranes are safe for operation.

You must:

Follow manufacturer's recommendations when installing and erecting tower, portal and pedestal cranes

WAC 296-831-41005.

Make sure tower, portal and pedestal cranes are erected properly

WAC 296-831-41010.

Make sure tower, portal and pedestal crane supports are safe WAC 296-831-41015.

Have load-rating charts for tower, portal and pedestal cranes available

WAC 296-831-41020.

Provide safe access to tower, portal and pedestal cranes

WAC 296-831-41025.

Keep tower, portal and pedestal brakes in safe operating condition

WAC 296-831-41030.

Provide two-blocking protection on tower, portal and pedestal cranes

WAC 296-831-41035.

Make sure electrical equipment on tower, portal and pedestal cranes is safe

WAC 296-831-41040.

Mark operating controls on tower, portal and pedestal cranes

WAC 296-831-41045.

Use lifting magnets properly

WAC 296-831-41050.

Equip traveling cranes properly

WAC 296-831-41055.

Provide fire extinguishers

WAC 296-831-41060.

Store personal and work materials properly

WAC 296-831-41065.

NEW SECTION

WAC 296-831-41005 Follow manufacturer's recommendations when installing and erecting tower, portal and pedestal cranes.

You must:

✎ Follow the manufacturer's recommendations when installing and erecting cranes.

- If the manufacturer's recommendations are not available, refer to ASME B30.4 - 1996 edition, including addenda A (1998) and B (1999).

NEW SECTION

WAC 296-831-41010 Make sure tower, portal and pedestal cranes are erected properly.

You must:

✎ Keep the manufacturer's or a qualified person's written erection instructions and a list of the weights of each component at the erection site for cranes erected or modified after 1990.

✎ Make sure a qualified person supervises the erection.

✎ Make sure the erection is performed in accordance with the manufacturer's or qualified person's recommendation.

✎ Make sure components are visually inspected before erection.

✎ Make sure that cranes that have been installed or modified after 1981 and that are required to weathervane when out of service are installed so that there is enough clearance for the boom and the superstructure to swing through a full three hundred sixty degree arc without hitting any object.

NEW SECTION

WAC 296-831-41015 Make sure tower, portal and pedestal crane supports are safe.

You must:

(1) Make sure rails on cranes installed or modified after 1973:

- Are securely attached to the supporting surface in a way that will withstand pressure applied by the maximum rated load.
- Have smooth joints in any rail splices.

(2) Are electrically grounded when they carry cranes that are electrically powered from an outside source.

NEW SECTION

WAC 296-831-41020 Have load-rating charts for tower, portal and pedestal cranes available.

You must:

✎ Make sure a durable, legible load-rating chart for each crane is available to the operator while at the controls.

NEW SECTION

WAC 296-831-41025 Provide safe access to tower, portal and pedestal cranes.

You must:

✎ Provide safe access to cabs, machinery platforms, and towers of cranes by access ladders or stairs.

Reference: See requirements for ladders and stairways in chapter 296-24 WAC, Part J-1 and WAC 296-800-250.

NEW SECTION

WAC 296-831-41030 Keep tower, portal and pedestal brakes in safe operating condition.

You must:

✎ Make sure cranes installed or modified after 1973 have:

- A power control braking means that is able to maintain controlled lowering speeds.
- At least one brake on the load hoist mechanism that has a holding capacity of at least one hundred twenty-five percent of the full load hoisting torque.
- An automatic way of stopping and holding the load if the actuating force is removed.

NEW SECTION

WAC 296-831-41035 Provide two-blocking protection on tower, portal and pedestal cranes.

You must:

✎ Make sure the load hoist of each crane installed or modified after 1973 has either a:

- Two-block limiting device;

OR

- Two-block warning feature.

NEW SECTION

WAC 296-831-41040 Make sure electrical equipment on tower, portal and pedestal cranes is safe.

You must:

✎ Make sure each electrically powered crane installed or modified after 1990 has a main disconnect switch:

- Mounted at or near the base of the crane.
- Able to be locked in the "OFF" position.

Reference: See WAC 296-800-280, Basic electrical rules, and chapter 296-24 WAC, Part L for additional wiring and electrical equipment requirements.

NEW SECTION

WAC 296-831-41045 Mark operating controls on tower, portal and pedestal cranes.

You must:

✎ Make sure that operating controls are marked with their function.

NEW SECTION

WAC 296-831-41050 Use lifting magnets properly.

You must:

✎ Make sure cranes installed or modified after 1973 that use a lifting magnet have a separate magnet circuit switch that is:

- Enclosed.
- Able to be locked in the open or "OFF" position.
- Connected on the power supply side of the crane disconnect switch.

✎ Make sure there is a way of discharging the inductive load of the lifting magnet.

✎ Make sure that loss of the remote signal, for a remote-operated crane installed or modified after 1996, does not demagnetize the lifting magnet.

NEW SECTION

WAC 296-831-41055 Equip traveling cranes properly.

You must:

- Make sure traveling cranes installed or modified after 1973 have:
  - Sweeps on the trucks, in front of the leading wheels, that extend to the top of the rail.
  - Guards on truck wheels.
- Make sure traveling cranes installed or modified after 1990 have:
  - A warning signal that goes on automatically whenever the crane moves.
  - Brakes that:
    - Hold the crane in position when not traveling.
    - Lock the wheels against rotation to resist wind and operational forces.
    - Automatically engage when power or actuating pressure is removed and power is not applied to the travel drive.
    - Provide a way of locking the wheels against rotation when the crane is out-of-service.

NEW SECTION

WAC 296-831-41060 Provide fire extinguishers for tower, portal and pedestal cranes.

You must:

- Make sure a fire extinguisher, with a minimum rating of 10 BC, is kept in the crane cab or at the machinery housing. **Reference:** See additional requirements in WAC 296-800-300, Portable fire extinguishers, found in the safety and health core rules.

NEW SECTION

WAC 296-831-41065 Store personal and work materials properly on tower, portal and pedestal cranes.

You must:

✎ Make sure clothing, personal belongings, tools, and other necessary articles are stored so they do not interfere with crane access or operation.

NEW SECTION

WAC 296-831-420 Hoisting equipment for tower, portal and pedestal cranes.

Your responsibility:

To make sure hoisting equipment on tower, portal and pedestal cranes is used correctly.

You must:

Use and maintain sheaves properly
WAC 296-831-42005.
Follow these requirements when using hoisting ropes
WAC 296-831-42010.
Use reeving accessories correctly
WAC 296-831-42015.
Use hooks correctly
WAC 296-831-42020.

NEW SECTION

WAC 296-831-42005 Use and maintain sheaves on tower, portal and pedestal cranes properly.

You must:

✎ Make sure sheaves on cranes installed or modified after 1973 are:

- Smooth and free from surface defects that could cause wire rope damage.

- Provided with guards or other methods to guide the rope into the groove of the sheave, if the rope can be momentarily unloaded.

NEW SECTION

WAC 296-831-42010 Follow these requirements when using hoisting ropes on tower, portal and pedestal cranes.

You must:

✎ Make sure wire rope is used as follows:

- Use only wire ropes recommended by the crane manufacturer.

- Follow the manufacturer's recommendations when socketing.

- Make sure tension in all parts of the rope is equal, if more than one part is used to support the load.

✎ Attach the wire rope to the crane as follows:

- The rope end must be anchored to the drum as specified by the crane or rope manufacturer.

- There must be enough rope so that at least two wraps of rope are on the drum when the hook is in its lowest position.

NEW SECTION

WAC 296-831-42015 Use reeving accessories on tower, portal and pedestal cranes correctly.

You must:

✎ Use reeving accessories correctly, as follows:

- Attach U-bolts on the dead or short end of the wire rope, with the live end resting in the saddle (see Illustration 400-1).

Place illustration here.

– Use only drop-forged steel wire rope clips.

– Follow the clip manufacturer's recommendation for spacing, number of clips, and tightening evenly to the recommended torque values.

– Retighten all nuts on clip bolts after initial load is applied to newly installed wire rope.

– Make sure swaged, compressed or wedged socket fittings are applied as recommended by the wire rope, crane, or fitting manufacturer.

– Make sure wire rope clips used with wedged sockets are attached only to the unloaded dead end. See Illustration 400-2. **Note:** Piggy-back style wire rope clips may be used if manufacturer's directions are followed.

Place illustration here.

NEW SECTION

WAC 296-831-42020 Use hooks correctly on tower, portal and pedestal cranes.

You must:

✎ Make sure hooks:

- Are either latched, with the latch bridging the throat opening of the hook, or are moused.
- Meet the manufacturer's recommendations.
- Are not overloaded.

NEW SECTION

WAC 296-831-430 Inspections, maintenance, and testing of tower, portal and pedestal cranes.

Your responsibility:

To keep tower, portal and pedestal cranes in safe operating

condition by performing regular inspections, maintenance, and testing.

You must:

Perform initial inspections on tower, portal and pedestal cranes

WAC 296-831-43005.

Perform frequent inspections on tower, portal and pedestal cranes

WAC 296-831-43010.

Perform periodic inspections on tower, portal and pedestal cranes

WAC 296-831-43015.

Inspect wire rope for tower, portal and pedestal cranes regularly

WAC 296-831-43020.

Maintenance:

Replace wire rope for tower, portal and pedestal cranes as required

WAC 296-831-43025.

Maintain and store wire rope for tower, portal and pedestal cranes safely

WAC 296-831-43030.

Refuel tower, portal and pedestal cranes properly

WAC 296-831-43035.

Establish and follow safe maintenance and repair procedures for tower, portal and pedestal cranes

WAC 296-831-43040.

Repair or replace hooks on tower, portal and pedestal cranes as required

WAC 296-831-43045.

Testing:

Perform operational tests on tower, portal and pedestal cranes

WAC 296-831-43050.

Test supports on newly installed tower, portal and pedestal cranes

WAC 296-831-43055.

Perform necessary load tests on repaired, modified or altered tower, portal and pedestal cranes

WAC 296-831-43060.

IMPORTANT:

The levels of service (light, normal, heavy, severe) used to separate the frequency of inspections on cranes are defined differently depending on the type of crane being used. For the purposes of WAC 296-831-420, the following definitions apply:

Light service: Service involving irregular operation, lifting loads that are generally one-half or less of the rated load.

Normal service: Service involving operating at less than

eighty-five percent of the rated load, with no more than ten lift cycles per hour except in isolated instances.

Heavy service: Service involving operating:

✎ At eighty-five percent to one hundred percent of the rated load;

OR

✎ More than ten lift cycles per hour as a regular procedure.

NEW SECTION

WAC 296-831-43005 Perform initial inspections on tower, portal and pedestal cranes.

You must:

✎ Make sure a qualified person inspects all cranes before use when they have been:

- Newly installed.
- Altered.
- Repaired.
- Modified.
- Reinstalled.
- Idle for more than twelve months.

✎ Make sure this inspection includes all items in Table 400-1, Frequent Inspection Checklist, Table 400-2, Periodic Inspection Checklist, and Table 400-3, Wire Rope Inspection.

NEW SECTION

WAC 296-831-43010 Perform frequent inspections on tower, portal and pedestal cranes.

You must:

✎ Make sure a designated person conducts frequent inspections on cranes in or available for use as follows:

- Perform inspections according to Table 400-2, Frequent Inspection Checklist.
- Examine any problems observed during the operation of the crane.
- Make sure a designated person conducts a more detailed inspection if hazardous conditions are found during the inspection.

✎ Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

Table 400-2
Frequent Inspection Checklist for Tower, Portal and Pedestal Cranes

Items to Check	How Often
Control mechanisms for: ✎ Maladjustment that interferes with proper operation	Daily for cranes in use
Hydraulic system for: ✎ Proper fluid level	Before use, for cranes idle more than one month
Control mechanisms for: ✎ Wear of components ✎ Contamination by lubricants	
Crane function operating mechanisms for: ✎ Maladjustment ✎ Wear of components	Heavy service: Daily to weekly Normal service: Weekly to monthly
Motion limiting devices for: ✎ Proper operation with the crane unloaded – Each motion should be inched into its limiting device or run in at slow speed	Light service: At least once a month Before returning to service for cranes idle more than a month
Load limiting devices for: ✎ Proper operation ✎ Accuracy of settings	
Hydraulic and pneumatic hoses	
Hooks and latches for: ✎ Deformation ✎ Chemical damage ✎ Cracks ✎ Wear	
Electrical equipment for: ✎ Malfunctioning ✎ Deterioration ✎ Dirt	At least once a month for cranes in regular service

✎ Moisture	Before returning to service for cranes idle for more than a month
Braces supporting towers Anchor bolt base connections for: ✎ Looseness ✎ Loss of preload	

NEW SECTION

WAC 296-831-43015 Perform periodic inspections on tower, portal and pedestal cranes.

You must:

✎ Make sure a designated person conducts periodic inspections of cranes in or available for use as follows:

– Perform inspections according to Table 400-3, Periodic Inspection Checklist, and include all items in Table 400-2, Frequent Inspection Checklist.

– Make sure a designated person conducts a more detailed inspection if hazardous conditions are found during the inspection.

✎ Make sure the crane is not used until any hazardous conditions found during the inspection have been corrected.

Table 400-3
Periodic Inspection Checklist for Tower, Portal and Pedestal Cranes

Items to Check	How Often
Deformed, cracked, or corroded members	
Bolts and rivets for tightness	
Sheaves and drums for: ✎ Cracks ✎ Wear	
Parts such as pins, bearings, shafts, gears, rollers, and locking devices for: ✎ Wear ✎ Cracks	Light service: Once per year

✎ Distortion	Normal service: Once or twice per year
Brake and clutch systems for: ✎ Wear	
Indicators (load, wind, boom angle, etc) for: ✎ Accuracy	Heavy service: Once per quarter
Power plants: ✎ Proper performance ✎ Compliance with safety requirements	
Electrical apparatus for: ✎ Signs of deterioration in controllers, master switches, contacts, limiting devices and controls	
Travel mechanisms for: ✎ Malfunction ✎ Excessive wear ✎ Damage	
Crane Hooks	
Hydraulic and pneumatic pumps, motors, valves, hoses, fittings, and tubing for: ✎ Excessive wear ✎ Damage	
Traction bolts used in connections and at the slewing bearing for: ✎ Proper tension (torque) ✎ Deformation or other damage	
Sheaves for: ✎ Cracks in the flanges and spokes	

NEW SECTION

WAC 296-831-43020 Inspect wire rope for tower, portal and pedestal cranes regularly.

You must:

- Make sure wire rope is inspected according to Table 400-4, Wire Rope Inspection Checklist.
- Do ONE of the following if the inspection shows damaged rope:

– Remove rope from service;

OR

– Perform a more detailed inspection as described in Table 400-3, Wire Rope Inspection Checklist.

- Keep a dated report of rope condition on file.

Table 400-4
Wire Rope Inspection Checklist for Tower, Portal and Pedestal Cranes

Check These Ropes:	This Often:
Running ropes for: - Distortion such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion - Loss of rope diameter in a short rope length - Unevenness of outer strands - General corrosion - Broken or cut strands - Number, distribution, and type of visible broken wires - Core failure in rotation resistant ropes	At least once a month for cranes in use Before use for cranes that have been idle for more than one month
The entire length of wire rope for:	

✎ Distortion of the rope, such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion ✎ General corrosion ✎ Broken or cut strands ✎ Number, distribution, and type of visible broken wires ✎ Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires ✎ Severely corroded or broken wires at end connections	At least once a year, more frequently if a qualified person determines it is needed

NEW SECTION

WAC 296-831-43025 Replace wire rope for tower, portal and pedestal cranes as required.

Maintenance:

You must:

✎ Replace or resocket wire rope when end connections develop more than two broken wires adjacent to a socketed end connection.

– Resocket an end connection only if the remaining rope will be long enough for full operation.

✎ Make sure wire rope is replaced when it shows ANY of the following:

– One outer wire broken at the contact point with the core of the rope, which protrudes or loops out from the rope structure.

– Wear of one-third the original diameter of outside individual wires.

– Kinking, crushing, birdcaging, or any other damage resulting in distortion of rope structure.

– Evidence of heat damage from any cause.

– **Running ropes** with:

✂ Six randomly distributed broken wires in one lay.

✂ Three broken wires in one strand in one lay.

– **Rotation resistant rope** with:

✂ Four randomly distributed broken wires in one lay.

✂ Two broken wires in one strand in one lay.

– Any ropes if the reduction from nominal diameter is greater than the manufacturer's recommendation.

✂ If you have no manufacturer's recommendations, see Table 400-5, Wire Rope Reduction from Nominal Diameter.

✎ Have a qualified person determine when to replace wire rope:

– Immediately.

– At the end of the work shift.

– Before the next use of the crane.

✎ Make sure replacement wire rope and connections are the same size, type, grade, construction and strength unless specified otherwise by either:

– The rope, crane, or hoist manufacturer;

OR

– A qualified person.

Table 400-5
Allowed Reduction from Nominal Diameter

Nominal Diameter	Maximum Allowable Reduction From Rope Diameter
Up to 5/16 in. (8 mm)	1/64 in. (0.4 mm)
Over 5/16 in. to 1/2 in. (13 mm)	1/32 in. (0.8 mm)
Over 1/2 in. to 3/4 in. (19 mm)	3/64 in. (1.2 mm)
Over 3/4 in. to 1 1/8 in. (29 mm)	1/16 in. (1.6 mm)
Over 1 1/8 in. to 1 1/2 in. (38 mm)	3/32 in. (2.4 mm)

NEW SECTION

WAC 296-831-43030 Maintain and store wire rope for tower, portal and pedestal cranes safely.

You must:

✎ Unreel or uncoil wire rope as recommended by the manufacturer. Avoid twisting or kinking the rope.

✎ Place seizings on each side of the area to be cut to

prevent wire rope strands from unraveling before you cut the rope.

✎ Avoid dragging the rope in dirt or around objects that can scrape, nick, crush, or make sharp bends in the rope.

✎ Make sure any lubricant used:

– Is compatible with the original lubricant.

– Does not hinder the visual inspection of the rope. **Note:** Wire rope should be maintained in a well-lubricated condition, giving special attention to sections that are hidden.

NEW SECTION

WAC 296-831-43035 Refuel tower, portal and pedestal cranes properly.

You must:

✎ Refuel cranes as follows:

– Turn off all engines.

– Prohibit smoking or open flames in the refueling area.

– Do not allow a portable gasoline container to be used unless it is an approved safety-type can with an automatic closing cap and flame arrester.

NEW SECTION

WAC 296-831-43040 Establish and follow safe maintenance and repair procedures for tower, portal and pedestal cranes.

You must:

(1) Make sure only designated persons perform maintenance tasks including adjusting, repairing, and replacing crane parts.

(2) Make sure all replacement parts are at least equal to the original manufacturer's specifications.

(3) Make sure all of the following are done before making major adjustments or repairs:

– Place controllers in the "OFF" position, except for test purposes.

– Make sure designated persons appropriately place "Warning" or "Out of Order" signs.

– Provide rail stops or other means of preventing interference if other cranes are operating on the same runway.

✂ If rail stops are not available or practical, provide a signal person at a visual vantage point, to observe the approach of other cranes and warn other operators.

Reference: See additional requirements in chapter 296-24 WAC, Part A-4, Controlling hazardous energy, when performing maintenance, adjustments or repairs.

You must:

(4) Do the following before restoring cranes to service:

- Reinstall all guards.
- Reactivate all safety devices.
- Remove trapped air from hydraulic systems.
- Remove replaced parts, loose material, and maintenance equipment.
- Have designated personnel remove "Warning" or "Out of Order" signs.

(5) Keep records of any alterations or modifications made on cranes, unless the crane manufacturer does the work. These records must include:

- Calculations and drawings of the alteration/modification, signed by a qualified person.
- Verification that the crane meets the applicable requirements of this rule.
- Records of tests performed according to WAC 296-831-42050 and 296-831-42055.

NEW SECTION

WAC 296-831-43045 Repair or replace hooks on tower, portal and pedestal cranes as required.

You must:

✎ Make sure a qualified person determines if a damaged hook needs to be replaced or can be repaired.

✎ Repair or replace a hook when it shows:

- Cracks, nicks or gouges.
- Wear of more than ten percent of the original sectional dimension, or as recommended by the manufacturer.
- A bend or twist exceeding ten degrees from the plane of the unbent hook.
- An increase in the throat opening of more than fifteen percent of the original sectional dimension, or as recommended by the manufacturer.

✎ Follow these requirements when repairing a hook:

- Only a designated person can repair cracks, nicks and gouges.
- Grind longitudinally.
- Follow the contour of the hook.
- The dimension of the hook must NOT be reduced more than ten percent of its original value, unless otherwise recommended by the manufacturer.

NEW SECTION

WAC 296-831-43050 Perform operational tests on tower, portal and pedestal cranes.

Testing:

You must:

✎ Make sure all operational tests are performed under the direction of a qualified person.

✎ Make sure all cranes are tested after being altered or modified.

✎ Make sure newly erected cranes and cranes that have been repaired are tested as follows:

- Test the functional motion of the crane first without a load, then at the rated load. Tests must include:

✂ Load hoisting and lowering.

✂ Boom hoisting and lowering, or traveling the trolley.

✂ Swing motion.

✂ Brakes and clutches.

✂ Limit, locking and safety devices.

- Test the trip setting of hoist limit devices by:

✂ Using an empty hook.

✂ Making a series of runs at increasing hook speeds, up to the maximum speed.

✂ Locating the limit device's actuator so under all conditions, it will trip in time to prevent contact of the lower load block with the upper load block or boom point sheaves.

Note: Testing on repaired cranes may be limited to the functions affected by the repair, as determined by a qualified person.

NEW SECTION

WAC 296-831-43055 Test supports on newly installed tower, portal and pedestal cranes.

You must:

✎ Make sure the supports on newly installed cranes are load tested as follows:

- Use a test load of one hundred ten percent of rated load at the radius producing the greatest load movement.

- For stationary tower or pedestal cranes, rotate the load slowly to the positions that cause maximum loading of each foundation and hold for at least fifteen minutes.

– For cranes designed to travel with a load, slowly travel the loaded crane the length of the runway with the crane oriented to cause the maximum wheel loadings on one rail, then return with the crane oriented to cause the maximum wheel loadings on the other rail.

– For traveling cranes not designed to travel with a load, test as a stationary crane.

NEW SECTION

WAC 296-831-43060 Perform necessary load tests on repaired, modified or altered tower, portal and pedestal cranes.

You must:

✎ Make sure any crane that has been altered or modified is load tested under the direction of a qualified person.

✎ Make sure a qualified person determines if load testing is needed on any crane after repair and that any necessary load tests are completed.

Note: The qualified person can limit the items checked during a load test to those functions that have been affected by the alteration, repair, or modification.

You must:

✎ Make sure all load testing is conducted as follows:

– Use a weight that is one hundred twenty-five percent of the rated load for the crane or hoist unless the manufacturer makes another weight recommendation.

– Choose the radii and boom angles that place maximum loading on the relevant crane parts.

NEW SECTION

WAC 296-831-440 Operating tower, portal and pedestal cranes.

Your responsibility:

To make sure tower, portal and pedestal cranes are operated safely.

You must:

Allow tower, portal and pedestal cranes to be operated only by specific people

WAC 296-831-44005.

Attach the load to the tower, portal or pedestal crane correctly

WAC 296-831-44010.

Operate tower, portal and pedestal cranes safely WAC 296-831-44015.

IMPORTANT:

If you operate your equipment near power lines, you will need to follow the requirements in chapter 296-24 WAC, Part L.

NEW SECTION

WAC 296-831-44005 Allow tower, portal and pedestal cranes to be operated only by specific people.

You must:

✎ Make sure only these people operate a crane:

- Designated persons who have successfully passed a practical operating exam for the specific type of equipment they will operate.
- Trainees, under the direct supervision of a designated person.
- Crane inspectors.
- Maintenance and test personnel, with the knowledge of the operator or other designated person.

NEW SECTION

WAC 296-831-44010 Attach the load to the tower, portal or pedestal crane correctly.

You must:

(1) Make sure the load is within the specifications of the load-rating chart, except when load testing.

(2) Make sure the load lines and attachments meet the following:

- Keep the hoist rope from kinking or wrapping around the load.
- Keep multiple part lines from twisting around each other.
- Bring the hook over the load in a way that prevents swinging.
- Attach the load to the hook with slings or other approved devices.
- Secure the load and balance it before lifting more than a few inches.
- Properly seat the rope on the drum and in the sheaves, if there is a slack rope condition.

(3) Make sure the lift and swing path is clear of

obstruction.

(4) Make sure tag or restraint lines are used when swinging of the load is hazardous.

NEW SECTION

WAC 296-831-44015 Operate tower, portal and pedestal cranes safely.

You must:

(1) Make sure the operator consults with the supervisor any time there are safety questions about handling any load.

✎ Make sure the operator notifies the supervisor and the next operator of any uncorrected defect in the crane if adjustments or repairs are necessary.

(2) Make sure the operator does not engage in any practice that diverts their attention while actually engaged in operating equipment.

(3) Make sure the operator puts all controls in the "OFF" or "neutral" position and makes sure all persons are in the clear before starting the equipment or closing the power disconnecting means.

(4) Make sure the operator tests all controls at the start of a new shift, and makes sure needed adjustments and repairs are made.

(5) Make sure the operator tests the brakes **every** time a load approaching the rated load is handled, by raising the load a few inches and then applying the brakes.

(6) Make sure the operator avoids sudden starts and stops when swinging the boom, moving the load up or down, or traveling the crane.

✎ Make sure the operator rotates the crane at a speed that does not allow the load to swing out beyond a controllable radius.

(7) Make sure the operator obeys any stop signal given by any person.

(8) Make sure the operator activates the drum holding device, if it is not automatic, if the load will stay suspended for a considerable length of time.

(9) Make sure the operator does the following before leaving the crane unattended:

✎ Sets the load down.

✎ Sets the trolley brakes and other locking devices.

✎ Brings the hook to the highest position.

✎ Disconnects power or disengages the master clutch, as applicable.

- Places controllers in the "OFF" position.
- Secures the crane against inadvertent travel.
- Stops the engine, when provided.

Note: When the crane operation is frequently interrupted during a shift, the engine may be left running while the operator is on the superstructure.

- Leaves the superstructure free to weathervane, unless otherwise recommended by the manufacturer or qualified person.
- Restrains the crane from traveling when leaving the crane overnight.

(10) Make sure the operator does the following whenever power is lost during operation:

- Immediately sets all brakes and locking devices, as applicable.
- Moves clutch or other power controllers to the "OFF" or "neutral" position.
- Sets down any suspended load under brake control, if practical.

(11) Make sure the operator restrains the crane when the wind alarm has sounded.

(12) Make sure the operator does NOT leave the controls when a load is suspended.

Exemption: The operator may leave the controls, if the load is suspended for a longer time than usual, IF these precautions are taken:
- The designated person and the operator have established the requirements for restraining the load, swing, and travel functions.
- Barricades or other precautions have been provided.

(13) Make sure the operator does NOT lower a load below the point where only two wraps of rope remain on the drum.

(14) Make sure the operator does NOT operate the crane when the wind speed has exceeded the maximum velocity recommended by the manufacturer.

NEW SECTION

WAC 296-831-500 Derricks.

Introduction:

WAC 296-831-500 through 296-831-540 apply to the following types of derricks:

- Guy.
- Stiffleg.
- Basket.
- Breast.
- Gin pole.
- Chicago boom.
- Shearleg.
- A-frame.

Derricks can be either temporarily or permanently

installed. They are used for lifting, lowering, and horizontal movement of freely suspended unguided loads.

NEW SECTION

WAC 296-831-510 Design and installation requirements for derricks.

Your responsibility:

To make sure your derricks are safe for operation.

You must:

Make sure equipment meets the appropriate design and construction requirements of this rule

WAC 296-831-51005.

Have load-rating charts for derricks available

WAC 296-831-51010.

Have radius or boom angle indicators on derricks

WAC 296-831-51015.

Mark operating controls on derricks

WAC 296-831-51020.

Provide fire extinguishers for derricks

WAC 296-831-51025.

Store personal and work materials properly on derricks

WAC 296-831-51030.

NEW SECTION

WAC 296-831-51005 Make sure equipment meets the appropriate design and construction requirements of this rule.

You must:

✎ Make sure derricks constructed and installed on or after May 1, 2004, meet the design specifications of the ASME B30.6 - 1995, including addenda A (1998), B (1999) and C (2001).

✎ Make sure derricks constructed before March 1, 2004, but on or after May 7, 1973, meet the design specifications of ASME B30.6 - 1969.

NEW SECTION

WAC 296-831-51010 Have load-rating charts for derricks available.

You must:

✎ Make sure durable, legible load-rating charts are provided for **permanently installed** derricks and are securely attached where workers responsible for the safe operation of the derrick can see them.

✎ Make sure legible load-rating charts are provided for derricks that are not permanently installed and are located at either the derrick or the job-site office.

✎ Make sure load rating charts include:

- Manufacturer's approved load ratings at corresponding ranges of boom angle or operating radii.
- Specific lengths of components the load ratings are based on.
- Required parts for hoist reeving.

Note: The size and construction of rope needs to be shown on either the rating chart or in the operating manual.

NEW SECTION

WAC 296-831-51015 Have radius or boom angle indicators on derricks.

You must:

✎ Make sure an accurate radius or boom angle indicator, readable from the operating position, is installed on derricks having a movable working boom.

NEW SECTION

WAC 296-831-51020 Mark operating controls on derricks.

You must:

✎ Make sure that:

- Operating controls are marked;

OR

- An explanation of the controls is posted in full view of

the operator.

NEW SECTION

WAC 296-831-51025 Provide fire extinguishers for derricks.

You must:

✎ Make sure a fire extinguisher, with a minimum rating of 10 BC, is kept in the crane cab or at the machinery housing.

Reference: See additional requirements in WAC 296-800-300, Portable fire extinguishers.

NEW SECTION

WAC 296-831-51030 Store personal and work materials properly on derricks.

You must:

✎ Make sure clothing, personal belongings, tools, and other necessary articles are stored so they do not interfere with derrick access or operation.

NEW SECTION

WAC 296-831-520 Hoisting equipment.

Your responsibility:

To make sure hoisting equipment on derricks is used correctly.

You must:

Use and maintain sheaves on derricks properly
WAC 296-831-52005.

Follow these requirements when using hoisting ropes on derricks
WAC 296-831-52010.

Use reeving accessories on derricks correctly
WAC 296-831-52015.

Use hooks on derricks correctly
WAC 296-831-52020.

NEW SECTION

WAC 296-831-52005 Use and maintain sheaves on derricks properly.

You must:

✎ Make sure sheaves are smooth and free from surface defects that could cause wire rope damage.

✎ Make sure guards are in place to:

– Guide the rope back into the sheave groove, when using ropes that can be momentarily unloaded.

– Prevent ropes from becoming fouled when the block is lying on the ground with loose ropes.

NEW SECTION

WAC 296-831-52010 Follow these requirements when using hoisting ropes on derricks.

You must:

✎ Make sure wire rope is used as follows:

– Use only wire ropes that are the size, grade and construction for the maximum load to be lifted.

– Make sure there is enough rope attached so that at least two wraps of rope are on the drum for the entire range of movement.

– Do not use rotation resistant rope for boom hoist reeving.

NEW SECTION

WAC 296-831-52015 Use reeving accessories on derricks correctly.

You must:

✎ Use reeving accessories correctly, as follows:

– Attach U-bolts on the dead or short end of the wire rope, with the live end resting in the saddle (see Illustration 500-1).

Place illustration here.

You must:

- Use only drop-forged steel wire rope clips.
- Follow the clip manufacturer's recommendation for spacing, number of clips, and tightening evenly to the recommended torque values.
- Retighten all nuts on clip bolts after initial load is applied to newly installed wire rope.
- Make sure swaged, compressed or wedged socket fittings are applied as recommended by the wire rope, crane, or fitting manufacturer.
- Make sure wire rope clips used with wedged sockets are attached only to the unloaded dead end.

Note: Piggy-back style wire rope clips may be used if manufacturer's directions are followed.

Place illustration here.

NEW SECTION

WAC 296-831-52020 Use hooks on derricks correctly.

You must:

✎ Make sure hooks:

- Are either latched, with the latch bridging the throat opening of the hook, or are moused.
- Meet the manufacturer's recommendations.
- Are not overloaded.

NEW SECTION

WAC 296-831-530 Inspections, maintenance and testing of derricks.

Your responsibility:

To keep derricks in safe operating condition by performing regular inspections, maintenance, and testing.

You must:

Inspections:

Perform initial inspections on derricks WAC 296-831-53005.

Perform frequent inspections on derricks WAC 296-831-53010.

Perform periodic inspections on derricks WAC 296-831-53015.

Inspect wire rope for derricks regularly WAC 296-831-53020.

Maintenance:

Replace wire rope for derricks as required WAC 296-831-53025.

Maintain and store wire rope for derricks properly WAC 296-831-53030.

Refuel derricks properly WAC 296-831-53035.

Establish and follow safe maintenance and repair procedures for derricks WAC 296-831-53040.

Repair or replace hooks on derricks as required WAC 296-831-53045.

Testing:

Perform operational tests on derricks WAC 296-831-53050.

Perform load tests on derricks WAC 296-831-53055.

NEW SECTION

WAC 296-831-53005 Perform initial inspections on derricks.

Inspection:

You must:

✎ Make sure a designated person inspects a derrick before placing in or returning to service whenever equipment has been:

- Newly installed.
- Altered.
- Repaired.
- Modified.
- Reinstalled.
- Idle (whether on standby or in storage) for more than six months.

✎ Make sure this inspection includes all items in Table 500-1, Frequent Inspection Checklist, Table 500-2, Periodic Inspection Checklist, and Table 500-3, Wire Rope Inspection.

NEW SECTION

WAC 296-831-53010 Perform frequent inspections on derricks.

You must:

- Make sure a designated person conducts frequent inspections on derricks as follows:
  - Perform inspections according to Table 500-1, Frequent Inspection Checklist.
  - Examine any problems observed during the operation of the derrick.
  - Carefully examine any identified deficiencies, and determine whether they constitute a safety hazard.
- Make sure the derrick is not used until any hazardous conditions found during the inspection have been corrected.

Table 500-1
Frequent Inspection Checklist for Derricks

Check These Items	This Often
All control mechanisms for: - Adjustment - Wear - Lubrication	Daily, for derricks in use
All chords and lacing	
Tension in guys	At least twice a year for standby derricks not in actual use
Deterioration or leakage in air or hydraulic systems	Before use, for derricks out of service more than one month
Hoist brakes, clutches, and operating levers for proper functioning before beginning operations	
Plumb of the mast	At least once a month for derricks in use
Derrick hooks for deformations or cracks	
Rope reeving for noncompliance with derrick manufacturer's recommendations	Before use, for derricks out of service more than one month

Electrical equipment for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation	At least twice a year for standby derricks not in actual use

NEW SECTION

WAC 296-831-53015 Perform periodic inspections on derricks.

You must:

✎ Make sure a designated person conducts periodic inspections on derricks as follows:

– Perform inspections according to Table 500-2, Periodic Inspection Checklist, and include all items in Table 500-1, Frequent Inspection Checklist.

– Carefully examine any identified deficiencies to determine whether they constitute a safety hazard.

✎ Make sure the derrick is not used until any hazardous conditions found during the inspection have been corrected.

✎ Keep dated inspection records of all critical items such as hoisting machinery, sheaves, hooks, chains, and other lifting devices.

Table 500-2
Periodic Inspection Checklist for Derricks

Check These Items	This Often
Structural members for: ✎ Deformations ✎ Cracks ✎ Corrosion	At least once a year **OR** As recommended by the manufacturer
Bolts or rivets for tightness	**OR**
Parts such as pins, bearings, shafts, gears, sheaves, drums, rollers, and locking and clamping devices, for: ✎ Wear ✎ Cracks ✎ Distortion	More frequently, if any of the following conditions call for it: Activity Severity of service Environmental conditions
Gudgeon pin, each time the derrick is erected, for:	

✎ Wear ✎ Cracks ✎ Distortion	
Power plants for: ✎ Proper performance ✎ Compliance with applicable safety requirements	
Hooks **Note:** Magnetic particle or other suitable crack detecting inspection should be performed at least once each year	
Foundation or supports for continued ability to sustain the imposed loads	

NEW SECTION

WAC 296-831-53020 Inspect wire rope for derricks regularly.

You must:

✎ Make sure wire rope is inspected according to Table 500-3, Wire Rope Inspection Checklist.

✎ Do ONE of the following if the inspection shows damaged rope:

– Remove rope from service;

OR

– Perform a more detailed inspection as described in Table 500-3, Wire Rope Inspection Checklist.

✎ Keep current dated and signed reports of rope condition on file and readily available.

Table 500-3
Wire Rope Inspection Checklist for Derricks

Check These Ropes	How Often
Check running ropes for:	

✎ Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires	At least once a month for derricks in use
✎ A number of broken outside wires and the degree of distribution or concentration of such broken wires ✎ Worn outside wires ✎ Corroded or broken wires at end connections ✎ Corroded, cracked, bent, worn, or improperly applied end connections ✎ Severe kinking, crushing, cutting, or unstranding	Before use for derricks that have been idle for more than one month
Inspect the entire length of wire rope for:	
✎ Distortion of the wire rope, such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core protrusion ✎ General corrosion	At least once a year for derricks in use
✎ Broken or cut strands	Before use for derricks that have been idle for more than one month
✎ Number, distribution, and type of visible broken wires	
Reference:	**Note:**
See WAC 296-831-52030, Replace wire rope as required, for removal criteria	Wire rope inspections do not need to be at equal calendar intervals, and should be more frequent as the rope gets older

✎ Reduction of wire rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires ✎ Severely corroded or broken wires at end connections ✎ Severely corroded, cracked, bent, worn, or improperly applied end connections	

NEW SECTION

WAC 296-831-53025 Replace wire rope for derricks as required.

Maintenance:

You must:

✎ Make sure wire rope is replaced when it shows ANY of the following:

– One outer wire broken at the contact point that protrudes or loops out from the rope structure.

– Wear of one-third the original diameter of outside individual wires.

– Kinking, crushing, birdcaging, or any other damage resulting in distortion of rope structure.

– Evidence of heat damage from any cause.

– **Running ropes** with:

✂ Six randomly distributed broken wires in one lay.

✂ Three broken wires in one strand in one lay.

– **Standing ropes** with:

✂ More than two broken wires in one lay in sections beyond end connections.

✂ More than one broken wire at an end connection.

– Any ropes if the reduction from nominal diameter is greater than the manufacturer's recommendation.

✂ If manufacturer's recommendations are not available, refer to Table 500-4, Allowed Nominal Reduction of Wire Rope.

✎ Have a qualified person determine when wire rope should be replaced:

– Immediately.

– At the end of the work shift.
– Before the next use of the derrick.

✎ Make sure replacement wire rope and connections are the same size, type, grade, construction, and strength unless specified otherwise by either:

– The rope, derrick, or hoist manufacturer;

OR

– A qualified person.

Table 500-4
Allowed Reduction from Nominal Diameter

Nominal Diameter	Maximum Allowable Reduction From Rope Diameter
Up to 5/16 in. (8 mm)	1/64 in. (0.4 mm)
Over 5/16 in. to 1/2 in. (13 mm)	1/32 in. (0.8 mm)
Over 1/2 in. to 3/4 in. (19 mm)	3/64 in. (1.2 mm)
Over 3/4 in. to 1 1/8 in. (29 mm)	1/16 in. (1.6 mm)
Over 1 1/8 in. to 1 1/2 in. (38 mm)	3/32 in. (2.4 mm)

NEW SECTION

WAC 296-831-53030 Maintain and store wire rope for derricks safely.

You must:

✎ Unreel or uncoil wire rope as recommended by the manufacturer. Avoid twisting or kinking the rope.

✎ Take the following precautions to prevent wire rope strands from unraveling before you cut the rope:

– For preformed rope, place one seizing on each side of the cut.

– For nonpreformed rope seven-eights inch in diameter or smaller, place two seizings on each side of the cut.

– For nonpreformed rope one inch in diameter or larger, place three seizings on each side of the cut.

✎ Avoid dragging the rope in dirt or around objects that can scrape, nick, crush, or make sharp bends in the rope.

✎ Make sure any lubricant used:

– Is compatible with the original lubricant.

– Does not hinder the visual inspection of the rope.

Note: Wire rope should be maintained in a well-lubricated condition, giving special attention to sections that are hidden.

NEW SECTION

WAC 296-831-53035 Refuel derricks properly.

You must:

✎ Refuel equipment as follows:

- Make sure the engine is turned off before refueling.
- Prohibit smoking or open flames in the refueling area.
- Do not allow a portable container to be used unless it is an approved safety-type can with an automatic closing cap and flame arrester.

NEW SECTION

WAC 296-831-53040 Establish and follow safe maintenance and repair procedures for derricks.

You must:

(1) Make sure all replacement parts are at least equal to the original manufacturer's specifications.

(2) Do ALL of the following before performing maintenance, adjustment, or repairs on a derrick or hoist:

- Arrange the derrick so it will cause the least interference with other equipment and operations.
- Engage all hoist drum dogs.
- Put "Warning" or "Out of Order" signs on the derrick and hoist.
- Lower and support or tie off the boom if it is being repaired.
- Establish a communications system between the operator and the person in charge of the operations.

Reference: See additional requirements in chapter 296-24 WAC, Part A-4, Controlling hazardous energy, when performing maintenance, adjustments or repairs.

You must:

(3) Do the following before restoring the equipment to service:

- Reinstall all guards.
- Reactivate all safety devices.
- Remove maintenance equipment.

NEW SECTION

WAC 296-831-53045 Repair or replace hooks on derricks as required.

You must:

✎ Make sure a qualified person determines if a damaged hook needs to be replaced or can be repaired.

✎ Repair or replace a hook when it shows:

- Cracks, nicks or gouges.
- Wear of more than ten percent of the original sectional dimension, or as recommended by the manufacturer.
- A bend or twist exceeding ten degrees from the plane of the unbent hook.
- An increase in the throat opening of more than fifteen percent of the original sectional dimension, or as recommended by the manufacturer.

✎ Follow these requirements when repairing a hook:

- Only a designated person can repair cracks, nicks and gouges.
- Grind longitudinally.
- Follow the contour of the hook.
- The dimension of the hook must NOT be reduced more than ten percent of its original value, unless otherwise recommended by the manufacturer.

NEW SECTION

WAC 296-831-53050 Perform operational tests on derricks.

Testing:

You must:

✎ Make sure all operational tests are performed under the direction of a designated person.

✎ Make sure new, altered, or reinstalled derricks are tested so they meet the requirements of this chapter. Operational testing must include:

- Load hoisting and lowering.
- Boom up and down.
- Swing.
- Operation of hoist clutches and brakes.

✎ Make sure anchorages are approved by a designated person. Rock or hairpin anchorages may require special testing.

NEW SECTION

WAC 296-831-53055 Perform load tests on derricks.

You must:

✎ Have a designated person load test all:

- New and reinstalled derricks.
- Repaired, altered or modified derricks unless a qualified person determines it is not needed.

✎ Make sure all load testing is conducted as follows:

- Use a test load that is at least one hundred percent of the rated load, but not more than one hundred ten percent, unless otherwise recommended by the manufacturer.
- Hoist the test load a few inches and hold to verify that the load is supported by the derrick and held by the hoist brake(s).
- Swing the derrick, if applicable, the full range of its swing, at the maximum allowable working radius for the test load.
- Boom the derrick up and down within the allowable working radius for the test load.
- Lower the test load, then stop and hold the load with the brake(s).
- Prepare and keep a written test report on file.

NEW SECTION

WAC 296-831-540 Operating derricks.

Your responsibility:

To make sure derricks are operated safely.

You must:

Assign a designated person to direct operations WAC 296-831-54005.

Allow derricks to be operated only by specific people WAC 296-831-54010.

Attach the load to the derrick correctly WAC 296-831-54015.

Operate derricks safely WAC 296-831-54020.

IMPORTANT:

If you operate your equipment near power lines, you will need to follow the requirements in chapter 296-24 WAC, Part L.

NEW SECTION

WAC 296-831-54005 Assign a designated person to direct operations.

You must:

✎ Assign a designated person to direct derrick operations who has either:

– Passed a practical operating examination;

OR

– Provides satisfactory evidence of qualifications and experience.

NEW SECTION

WAC 296-831-54010 Allow derricks to be operated only by specific people.

You must:

✎ Make sure only these people operate a derrick:

– Designated persons who have successfully passed a practical operating exam for the specific type of equipment they will operate.

– Trainees under the direct supervision of a designated person.

– Maintenance and test personnel, with the knowledge of the operator or other designated person.

NEW SECTION

WAC 296-831-54015 Attach the load to the derrick correctly. You must:

(1) Make sure the load is within acceptable weight:

– Stay within the specifications of the load-rating chart, except when load testing.

– Determine the weight of any load approaching the derrick's maximum load rating to within +/- ten percent, before it is lifted.

(2) Make sure the load lines and attachments meet the

following:

– Keep the hoist rope from kinking or wrapping around the load.

– Keep multiple part lines from twisting around each other.

– Attach the load to the hook with slings or other approved devices.

– Bring the hook over the load in a way that prevents swinging.

– Secure the load and balance it before lifting more than a few inches.

– Properly seat the rope on the drum and in the sheaves, if there is a slack rope condition.

NEW SECTION

WAC 296-831-54020 Operate derricks safely.

You must:

(1) Make sure the operator consults with the supervisor any time there are safety questions about handling any load.

(2) Make sure the operator tests the brakes **every** time a load approaching the rated load is handled, by raising the load a few inches and then applying the brakes.

(3) Make sure the operator is informed when ropes are handled on a winch head.

✎ Make sure the operator stays within reach of the power unit control lever while a winch head is being used.

(4) Make sure the operator avoids sudden starts and stops when rotating the derrick.

✎ Make sure the operator rotates the derrick at a speed that does not allow the load to swing out beyond a controllable radius.

(5) Make sure the operator engages positive holding means, such as dogs or pawls, when securing the boom.

✎ Make sure the operator uses means other than the brake alone, such as a dog, or pawl and ratchet, when the load must be suspended for a considerable length of time.

(6) Make sure the operator does either of the following when the boom is not in use:

✎ Lays the boom down and secures it to a stationary member, as close to under the head as possible;

OR

✎ Hoists the boom to a vertical position and secures it to the mast.

(7) Make sure the operator does NOT perform side loading except when specifically authorized by a qualified person who

has determined that the various structural components will not be overstressed.

(8) Make sure the operator does NOT allow anyone to ride on the load or hook.

(9) Make sure the operator does NOT lower the boom or the load to less than two full wraps of rope on the drums.

(10) Make sure the operator does NOT leave the control position while a load is suspended.

REPEALER

The following sections of the Washington Administrative Code are repealed:

WAC 296-24-235	Overhead and gantry cranes.
WAC 296-24-23501	Definitions.
WAC 296-24-23503	General requirements.
WAC 296-24-23505	Cabs.
WAC 296-24-23507	Footwalks and ladders.
WAC 296-24-23509	Stops, bumpers, rail sweeps, and guards.
WAC 296-24-23511	Brakes.
WAC 296-24-23513	Electric equipment.
WAC 296-24-23515	Hoisting equipment.
WAC 296-24-23517	Warning device.
WAC 296-24-23519	Inspection.
WAC 296-24-23521	Testing.
WAC 296-24-23523	Maintenance.
WAC 296-24-23525	Rope inspection.
WAC 296-24-23527	Handling the load.
WAC 296-24-23529	Operators.
WAC 296-24-23531	Other requirements--General.
WAC 296-24-240	Crawler locomotive and truck cranes.
WAC 296-24-24001	Definitions.
WAC 296-24-24003	General requirements.
WAC 296-24-24005	Load ratings.
WAC 296-24-24007	Inspection classification.
WAC 296-24-24009	Testing.
WAC 296-24-24011	Maintenance procedure.
WAC 296-24-24013	Rope inspection.
WAC 296-24-24015	Handling the load.
WAC 296-24-24017	Other requirements.
WAC 296-24-24019	Operating near overhead electric power lines.
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NEW SECTION

WAC 296-831-900 Definitions.

A-frame derrick

A derrick with:

✎ Two upright members that are apart from each other at the lower ends and joined at the top.

✎ The boom hinged from a cross member that is between the bottom ends of the two upright members.

✎ The boom point fastened to the point where the side members join.

✎ The side members braced or guyed at the point where they join.

ANSI

The American National Standards Institute. Commonly used to refer to national consensus standards published by this organization.

Anti two-block device

A device that disengages all crane functions that can cause two-blocking.

ASME

The American Society of Mechanical Engineers. Used to refer to national consensus standards published by this organization, as in "see ASME B30.5."

Automatic crane

A crane that operates through a preset cycle or cycles when activated.

Ballast

Weight added to the crane to provide stability for lifting working loads.

Basket derrick

A derrick without a boom, with:

✎ The base supported by ropes attached to corner posts or

other parts.

- The base at a lower elevation than the supports.

Boom

A member used to support the hoisting equipment. A boom is hinged to a mast or other structure, and has its outer end supported by ropes, chains, rods, or hydraulic cylinders.

Boom angle

The angle above or below horizontal of the longitudinal axis of the boom base section.

Boom angle indicator

A device that measures the angle of the boom to the horizontal.

Boom harness

The block and sheave arrangement on the boom point, where the topping lift cable is reeved for changing the boom angle.

Boom hoist

A hoist drum and rope reeving system used to raise and lower the boom.

Boom point

The outward end of the top section of the boom.

Boom stop

A device that limits the angle of the boom at its highest position.

Breast derrick

A derrick without a boom that has two side members, farther apart at the base than at the top, tied together at the top and bottom by rigid members. The load is lifted and lowered by ropes through a sheave or block secured to the top of the crosspiece.

Bridge

The part of a crane that carries the trolley or trollies. This includes the girders, trucks, end ties, footwalks, and drive mechanism.

Bridge travel

The crane movement in a direction parallel to the crane runway.

Bumper

An energy absorbing device for reducing impact when a moving crane or trolley reaches the end of its permitted travel; or when two moving cranes or trolleys come in contact.

Cab

The operator's compartment on a crane or derrick.

Cab-operated crane

A crane controlled by an operator in a cab located on the bridge or trolley.

Chicago boom derrick

A boom attached to a structure, with an outside upright member of the hoist structure serving as the mast, and the boom mounted in a pivoting seat secured to the upright.

Conductors, bridge

The electrical conductors located along the bridge structure of a crane to provide power to the trolley.

Conductors, runway

The electrical conductors located along a crane runway to provide power to the crane.

Counterweight

A weight added to the machine to provide stability for lifting working loads.

Crane

A machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine.

Derrick

A piece of equipment used with a hoisting mechanism and operating ropes, with or without a boom, that has a mast or equivalent part held at the end by guys or braces.

Designated person

A person who has been selected or assigned by the employer as being capable of performing specific duties.

Drum

The cylindrical part that the ropes are wound around for raising or lowering the load.

Eye

A loop formed at the end of a rope by securing the dead end to the live end at the base of the loop.

Floor-operated crane

A crane that is controlled by an operator on the floor or an independent platform, using a pendant or nonconductive rope.

Footwalk

The walkway attached to the bridge or trolley for access purposes.

Gantry

A movable structural frame that is able to support a crane and its loads.

Gin pole derrick

A boom, without a mast, with guys arranged from its top to let the mast lean in one or more directions.

Guy

A rope used to steady or secure the mast or other member in a desired position.

Guy derrick

A fixed derrick with a mast that is capable of being rotated three hundred sixty degrees, but not capable of a continuous rotation. This derrick:

- Is supported in a vertical position by guys and a boom.
- Has a boom with the bottom end hinged or pivoted to move in a vertical plane.
- Has a reeved rope between the head of the mast and the

boom harness for lifting and lowering the boom.

✎ Has a reeved rope from the boom point for lifting and lowering the load.

Hairpin anchor

A guy-supporting anchor, shaped like a hairpin, that is placed in footings or walls before concrete is poured and held in place by the cured concrete.

Limit switch

A switch that is operated by some part or motion of a power-driven machine or equipment to alter the electric circuit associated with the machine or equipment.

Load

The total weight on the load block or hook.

Load block

The assembly of hook or shackle, swivel, bearing, sheaves, pins, and frame suspended by the hoisting rope.

Load block, upper

The assembly of sheaves, pins, and frame suspended from the boom.

Main switch

A switch controlling the entire power supply to the crane.

Mast

The upright member of the derrick.

Outriggers

Metal arms attached to the mounting base that rest on supports at the outer ends.

Overhead crane

A crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead fixed runway structure.

Pawl (dog)

A device to keep a member from moving in one or more directions.

Pedestal crane

A crane with a rotating superstructure with operating machinery and boom, mounted on a pedestal.

Portal crane

A crane that has a rotating superstructure with operating machinery and boom, mounted on a gantry. It usually has a portal opening between the gantry columns or legs for traffic to pass beneath the crane. It can be mounted on a fixed or traveling base.

Qualified person

A person who has successfully demonstrated the ability to solve problems relating to the subject matter, work, or project, either by:

✎ Possession of a recognized degree, certificate, or professional standing;

OR

✎ Extensive knowledge, training, and experience.

Rated load

The maximum load for which a crane, derrick, or individual hoist is designed and built.

Reeving

A rope system that has the rope traveling around drums and sheaves.

Remote-operated crane

A crane controlled by an operator who is not in a pulpit or in the cab attached to the crane, using any method other than pendant or rope control.

Rock anchor

An anchoring device that is inserted into a hole drilled into rock or concrete.

Rope

Wire rope, unless otherwise specified.

Runway

The assembly of rails, beams, girders, brackets, and framework that the crane or trolley travels on.

Safety hook

A hook with a latch to prevent slings or loads from accidentally slipping off the hook.

Service levels

(*Light service, normal service, heavy service, severe service*.) The criteria for determining the different levels of service vary from crane type to crane type. The definition that applies to a specific style of crane or derrick can be found in the text of that section.

Shearleg derrick

A boom, with or without a mast, that is:

✎ Not capable of swinging.

✎ Hinged at the bottom.

✎ Raised and lowered by a boom-hoist mechanism or a hydraulic cylinder.

Side loading

When a load is applied at an angle to the vertical plane of the boom.

Sill

A member connecting the foot block and the stiffleg, or a member connecting the lower ends of a double-member mast.

Standby crane

A crane that is not in regular service but is used intermittently.

Standby derrick

A derrick not in regular service that is used only occasionally as required.

Stiffleg

A rigid member supporting the mast at the head.

Stiffleg derrick

A fixed derrick with a mast that is capable of being rotated three hundred sixty degrees, but not capable of a continuous rotation. This derrick:

- Has a mast that is supported or held in place by two or more stiff members, called stifflegs, that are capable of resisting tensile and compressive forces.
- Has a boom with the bottom end hinged or pivoted to move in a vertical plane.
- Has a reeved rope between the head of the mast and the boom harness for lifting and lowering the boom.
- Has a reeved rope from the boom point for lifting and lowering the load.
- Generally has sills connecting the lower ends of the stifflegs to the foot of the mast.

Stop

A device that limits travel of a trolley or crane bridge. This device normally is attached to a fixed structure and normally does not absorb energy.

Superstructure

The rotating upper frame of the machine and the operating machinery mounted on it.

Tackle

Ropes and sheaves arranged for hoisting and pulling.

Tower

A structural frame that is able to support a superstructure and its loads.

Tower crane

A crane with a tower between the superstructure and the base structure, and can be on either a fixed or traveling base.

Trolley

The unit that travels on the bridge rails and carries the hoisting mechanism.

Trolley travel

The trolley movement along the crane runway.

Truck

The unit consisting of a frame, wheels, bearings, and axles that supports the bridge girders or trolleys.

Two-block damage prevention feature

A system that will stall, without causing damage to the hoist rope or machinery, whenever two-blocking occurs.

Two-block warning feature

A warning device to alert the operator of a possible two-blocking condition.

Two-blocking

When a lower load block or hook assembly comes into contact with the upper load block or boom point sheave assembly.

Weathervaning

Swinging of an out-of-service crane caused by wind, so as

to expose the minimal surface area to the wind.

Working load

The weight of the entire load applied to the derrick, includes the load attaching equipment.